

NOTICING IN TEXT-BASED COMPUTER-MEDIATED COMMUNICATION: A
STUDY OF A TASK-BASED TELECOMMUNICATION BETWEEN NATIVE AND
NONNATIVE ENGLISH SPEAKERS

A Dissertation

by

WEN-CHUN CHEN

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2008

Major Subject: Curriculum and Instruction

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ABSTRACT

Noticing in Text-Based Computer-Mediated Communication: A Study of a Task-Based Telecommunication between Native and Nonnative English Speakers. (August 2008)

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This dissertation investigated the occurrence and the effect of incidental noticing in a text-based Computer-Mediated Communication (CMC) environment on enhancing second language learning. Learning proficiency was also examined as a possible intervening variable. This was a quasi-experimental study of sixteen nonnative English speakers from a four-year college in Taiwan, collaborating with sixteen native speaking peers in Texas, via chat agents in order to complete two communicative learning tasks over a two-month period of time.

Two posttests were customized for each Nonnative English Speaker (NNES) in order to assess his/her second language learning outcomes. In addition, Language-Related Episode's (LRE's) characteristics were expected to serve as powerful predictors of NNES' correct language learning outcomes. In order to unveil the possible impact of the learner's language proficiency level and its effect on noticing, eight low- intermediate and eight high- intermediate NNESs were included in the study. The findings revealed that CMC context and native and nonnative English

speaking task-based peer interactions promoted learner's noticing and affected the learning performance of NNEs of different levels. The posttest performance showed that incidental noticing facilitated learner's linguistic knowledge intake and memory retention. Text-based CMC created a visual and collaborative context which allowed NES peers to offer NNEs of different levels personalized feedback.

Among LRE's characteristics, successful uptake, as a powerful predictor, constantly entered all the models generated by logistic regression analysis, which underpinned the importance of quality uptake during the two-way communication for second language learning. In addition, directness (explicit feedback) and response (elicitation) also appeared in regression models of the subsets of LRE data, which indicated the particular type of feedback needed by learners, especially lower proficiency level ones. In addition, NESs' involvement also facilitated NNEs' noticing; NES peers applied elicitation techniques to redirect learner's attention to the problematic utterances and initiated meaning negotiation. The findings reveal that incidental noticing is beneficial to learning, especially when learners are provided with explicit feedback and incorporate the targeted linguistic items into their language production.

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TABLE OF CONTENTS

	Page
ABSTRACT	iii
ACKNOWLEDGEMENTS	v
TABLE OF CONTENTS	vi
LIST OF FIGURES	viii
LIST OF TABLES	ix
CHAPTER	
I INTRODUCTION.....	1
The Study	6
Definition of Terms	10
Organization of the Dissertation	11
II INCIDENTAL NOTICING: TASK-BASED TELECOMMUNICATION BETWEEN LANGUAGE LEARNERS AND NATIVE SPEAKERS	13
Overview	13
Incidental Noticing	13
Noticing and Text-based CMC	15
Assessment of Noticing and Subsequent SLA	20
The Study	23
Research Questions	24
Methodology	25
Results and Discussion	38
Conclusion and Implications	53
III LEARNERS OF DIFFERENT PROFICIENCY LEVELS AND INCIDENTAL NOTICING IN TASK-BASED TELECOMMUNICATION	58

CHAPTER	Page
Overview.....	58
Introduction.....	59
Learner's Proficiency and Noticing.....	62
The Study.....	66
Methodology.....	66
Results and Discussion.....	81
Conclusion and Implications.....	97
IV CONCLUSION.....	102
Summary.....	102
Pedagogical Implications.....	104
Limitations and Future Research.....	105
REFERENCES.....	107
APPENDIX A.....	114
APPENDIX B.....	118
VITA.....	119

LIST OF FIGURES

FIGURE	Page
1.1 Organization of the Dissertation	12
2.1 The Process of Learning Implicit Language Knowledge	14
2.2 The Role of Explicit Knowledge in L2 Acquisition	15
2.3 SLA Model	18
3.1 Proficiency Test: GEPT Test Results and Two Proficiency Levels.....	68
3.2 The Comparison among the Quantities of Grammar-, Vocabulary-, and Spelling- related LREs Generated by Lower-level NNEs and Higher- level NNEs	84
3.3 The Percentages of LRE Characteristics Generated by Lower- and Higher-level Groups	84
3.4 The Comparison between Lower-level NNEs' and Higher-level NNEs' Correct Response Percentages of Correction, Suppliance, and Spelling Test Types	86

LIST OF TABLES

TABLE	Page
2.1 Timeline and Stages of the Treatment.....	27
2.2 Characteristics of LREs.....	28
2.3 Example of Coding Scheme	30
2.4 Binary Variables of Logistic Regression	36
2.5 Total LREs, Total and Average Number of Words of LREs, Tested LREs, and LREs per 10,000 Words	39
2.6 Test Results	43
2.7 Predictors in Three Logistic Regression Models (Uncategorized, Correction, and Suppliance).....	47
2.8 Predictors in the Logistic Regression Model of Correction Test Item Type.....	51
2.9 Predictors in the Logistic Regression for Suppliance Test Item Type	52
3.1 Timeline and the Stages of the Treatment.....	71
3.2 Characteristics of LREs.....	75
3.3 Example of Coding Scheme	77
3.4 Binary Variables of Logistic Regression	79
3.5 Frequency of LREs Generated by Lower- and Higher- Proficiency level NNESs.....	82
3.6 Test Results	85

TABLE	Page
3.7 Logistic Regression Results of Uncategorized Test Items Divided by Proficiency Levels (Lower-Proficiency vs. Higher-Proficiency).....	90
3.8 Logistic Regression Results (with Proficiency Level as an Additional Variable)	92
3.9 Results of the Logistic Regression of Correction Test Item Type	95
3.10 Results of the Logistic Regression of Suppliance Test Item Type.....	96

CHAPTER I

INTRODUCTION

Noticing is defined as a learner's awareness of linguistic knowledge through which input is processed from short-term memory to long-term memory, where acquisition takes place (Cross, 2002; Torlaković & Brook, 2002). Without this subtle yet critical operation on the part of a learner, input would not be salient and intake would not occur (Ellis, 1997). Noticing is a critical intermediate step between input and knowledge transformation and has become one of the most important cognitive constructs in second-language acquisition (SLA). In fact, some researchers, including Schmidt (1990; 2001) and Ellis (1997), claim that noticing is a prerequisite for language acquisition. Without it, learners may overlook problematic linguistic issues and fail to improve their interlanguage quality. Even though the relative influence of noticing remains controversial in the area of cognitive psychology, the role of noticing in language learning is now considered definitive. Findings from early empirical research (Ellis, Loewen, & Erlam, 2006; Izumi, 2002; Loewen, 2003a, 2003b, 2004, 2005; Takahashi, 2005; Williams, 1999, 2001) have shown that learners improve their interlanguage by consciously attending to (i.e., noticing) problematic linguistic items during meaning negotiations with their counterparts. To be more specific, noticing helps learners become more accurate in target language production because it compels learners to focus on

This dissertation follows the style of *The Modern Language Journal*.

form in order to resolve incomplete understandings during interactions (Gass, 1997; Long, 1991).

During a two-way conversation, noticing occurs when learners consciously and subjectively choose to pay attention to a specific piece of linguistic information regardless of the presence of other competing stimuli (Gass, 1997; Schmidt, 1990). Swain (2000), in her output hypothesis, describes this process as “learners’ finding and filling holes” (p.100) in their interlanguage while reconstructing detailed texts for better output (i.e. “pushed output” [p.99]). Recent SLA pedagogies have proposed that consciousness-raising accompanied by focus on form can help learners improve levels of grammatical accuracy, which cannot be achieved solely by comprehensible input (Izumi & Bigelow, 2000; Weatherford, 1997). When a trigger (a problematic item) arises in an incomplete understanding, the learner and his/her counterpart are spontaneously presented with an opportunity to focus on the problem and strive to resolve it by improving the quality of the output through knowledge co-construction (i.e., meaning negotiation) (Gass, 1997). This peer collaboration transforms a conventional one-way, teacher-centered instruction into an interactive and authentic transmission of knowledge between students. To be more specific, an integration of meaning-focus and form-focus instruction (also known as a task-based language learning approach [Long, 1991]) creates a communicative context that helps learners transform declarative knowledge into procedural knowledge. Many researchers endorse task-based language learning and its capability to facilitate SLA through meaning negotiation under the Interactionist framework (Izumi, 2000; Izumi, 2002; Izumi & Bigelow, 2000; Izumi, Bigelow,

Fujiwara, & Fearnow, 1999; Lai & Zhao, 2006; Loewen, 2002, 2003a, 2003b, 2004, 2005; Long, 1991; Mackey, 2006; Smith, 2003a, 2003b).

Noticing¹ is an internal operation through which a learner processes input and transforms it into knowledge. However, the external operation, which Smith (1993, p. 167) calls “input enhancement,” is also influential. Several related factors in language teaching and learning could affect the outcome (Ellis, 2005), e.g., medium (face-to-face vs. online) (Lee, 2002; Skehan, 2003), interlocutors (native vs. nonnative speaking interlocutors of different language proficiency, or teacher vs. student) (Fernandez-Garcia & Martinez-Arbelaiz., 2002; Gass & Varonis, 1985; Long, 1983a, 1983b; Mackey, 2006; Pica, 1988), and context (classroom environment or interaction set-up) (Keller-Lally, 2006; Loewen, 2005; Long, 1989). The current literature on noticing, however, rarely covers the changes wrought by these external pedagogical manipulations, such as through the use of technology (e.g., computer-assisted communication [CMC]) and networked access to native speakers. More empirical research is needed to investigate the use of CMC and involvement of native English speaking peers in promoting incidental noticing.

The literature has showed that CMC can empower English-language learners in the following ways: 1) it elicits a higher quantity and quality (lexically and syntactically) of language production from learners, compared to face-to-face interactions (Blake, 2000; Kern, 1995; Warschauer, 1996); 2) a semi-written and semi-spoken hybrid language allows learners more time to process input and output while still retaining the

¹ There are two types of noticing in the literature: planned focus on forms and incidental focus on forms. The current study focuses on incidental noticing, during which focus on form is not pre-planned.

authenticity of verbal language (Beauvois, 1992; Hudson & Bruckman, 2001); 3) it can offer learners access to NESs of the target language (the language model) regardless of obstacles presented by geographic distance (Warschauer, 1997); and 4) it provides indirect and egalitarian human contact between participants by reducing learners' anxiety regarding their lower proficiency or social/gender status (Shin, 2006; Warschauer, 1997). Recognizing CMC's potential in SLA, a few researchers (Lai & Zhao, 2006; Shekary & Tahririan, 2006) investigated whether learners remain aware of their linguistic problems (i.e., can notice them) when face-to-face interactions are replaced with CMC. Pellettieri (2000) pointed out that the intermediate learners of Spanish in his study conducted in a CMC setting were surprisingly able to pay extra attention (noticing) to grammatical details and produce more native-like output. He concluded the reason to be the visual display of the conversation and additional thinking time in CMC.

Chapelle (1999) describes the interrelatedness between CMC and noticing in SLA from an Interactionist perspective:

- 1) Learners should notice the linguistic characteristics of the target-language input that they receive [during online interactions]; 2) learners need to have opportunities to produce target-language output; 3) learners need to notice errors in their output; 4) learners need to correct their linguistic output; and 5) learners need to engage in target language interaction whose structure can be modified as needed for comprehension.

(p.199)

Chapelle's assertion makes it clear that noticing is necessary for language acquisition (Hegelheimer & Chapelle, 2000; Schmidt, 1990) and that online interaction between interlocutors may not be effective by itself. However, the impact of noticing on language learning using CMC has not been sufficiently investigated. The current research aims to contribute to the growing body of knowledge by relating incidental noticing to SLA and exploration into CMC context using an experimental design.

Furthermore, NES' involvement can also greatly affect the second language (L2) learning outcome. Pertinent research on face-to-face contexts shows that L2 learners (nonnative speakers, or NNEs), when interacting with NESs, tend to strive to close the gap between their current state and the ideal language models, receive more comprehensive input, generate more meaning negotiation, and improve the quality of their interlanguage (Brock, Crookes, Day, & Long, 1986; Gass & Varonis, 1985; Long, 1983b; Pica, 1988). These effects are also documented in studies conducted in CMC settings (Braul, 2006; Cifuentes & Shih, 2001; Kitade, 2005; Kung, 2002; Schwienhorst, 2004; Shin, 2006; Warschauer, 1997, 2001). Therefore, it is logical to assume that NES' involvement will also strengthen L2 learner's noticing during online interactions.

Most NES-NNE interactions referenced in SLA studies of noticing examine the teacher-student relationship (Ellis, Basturkmen, & Loewen, 2001a, 2002; Loewen, 2003a, 2004, 2005), in which power issues (Hofstede, 1986) or linguistic authority (Katchen, 2002) of unequal-power discourse could become relevant. However, this is a common problem in most language classrooms, especially in EFL classrooms, where the teacher is the sole authority and source of knowledge. The introduction of CMC allows

cross-border connections between NES-NNES students. In the current study, a group of Taiwanese English-language learners and a group of American students who were native English speakers collaborated in two tasks via text-based CMC. This student-student (peer) connection was clearly more learner-centered than is possible with student-teacher interactions. The purpose of the study was to investigate the occurrence and impact of noticing on SLA in an online NES-NNES dyadic interaction. Since the double stimulants (NES-NNES peer interaction plus CMC) and their impact on learner's noticing are underexplored, the present study will examine the occurrence and impact of noticing in an online setting by connecting 16 Taiwanese EFL (English as a foreign language) students and 16 English-speaking American students in a task-based language learning experience via text-based chat.

THE STUDY

This study was designed to investigate the effect of noticing in dyadic native-nonnative CMC. Observing and measuring the influence of noticing is a challenging task, because noticing is a subtle and internal psychological process. This perhaps explains why most studies on noticing remain theoretical or descriptive (Cross, 2002; Ellis, 2001; Ellis et al., 2001a; Ellis et al., 2001b; Ellis et al., 2002; Gass, 1997; Schmidt, 1990, 2001). Despite these difficulties, several researchers have managed to present evidence and proposed research tools to support the pedagogical effect of noticing in face-to-face contexts (Ellis et al., 2001a; Ellis et al., 2006; Loewen, 2003a, 2003b, 2004, 2005; Schmidt & Frota, 1986). Recent literature (Swain, 2000, 2001) has

proposed the use of language-related episodes (LREs), which are mini-dialogues in which learners discuss language or question their own language use or that of others to observe learner's noticing in both CMC (Shekary & Tahririan, 2006) and face-to-face settings (Ellis et al., 2001a, 2001b; Loewen, 2002, 2003a, 2003b, 2004, 2005; Swain, 2000, 2001; Williams, 2001). Usually, LRE is triggered by a language problem and concludes with the identification of a solution. In an LRE, the participants in the dyad initiate, notice, discuss, and resolve one or more than one problematic linguistic item. This process is also referred as focusing on form (Long, 1991). As a research tool, LREs are operationalized to analyze the construct of noticing so that noticing becomes a visible cognitive process that exists within the collective dialogues (i.e., "knowledge-building dialogues" which "construct linguistic knowledge . . . where language use and language learning can co-occur" [Swain, 2000, p.97]).

LREs can provide targets for measuring the effectiveness of noticing. By examining the content of LREs, one can identify a learner's lack of knowledge of some linguistic items, a process that functions similarly to a pretest. In addition, Long (2000) and Ellis (2001) suggest assessing the effectiveness of noticing by retrieving the knowledge of the targeted linguistic items from learners' memory through the use of individually tailored posttests derived from the items discussed during LREs. This can provide an indication of a learner's interlanguage development through noticing. While LREs and tailor-made posttests have allowed researchers to examine the effectiveness of noticing, Loewen (2005) and Shekary & Tahririan (2006) took this process a step further by designing immediate and delayed tailor-made posttests (for individual learners) to

quantify learners' recent linguistic knowledge stored in their short-term and long-term memory. Among the LRE characteristics (type, linguistic focus, source, complexity, directness, timing, emphasis, response uptake, and successful uptake), successful uptake has been reported as the strongest predictor of correct test responses in both findings. However, more studies are required to validate and theorize the effect of noticing. The current study is an attempt to contribute to this growing body of SLA scholarship under the Interactionist Account.

With the operationalization of noticing and use of LREs for assessment of its impact on subsequent SLA (i.e., LREs analysis and tailor-made posttests, both immediate and delayed), the present study attempts to investigate NES' involvement and CMC's impact on L2 learner's noticing and learning performance. The following research questions will be addressed in Chapter II:

1. Do learners notice linguistic gaps in their interlanguage during online task-based negotiations with native English-speaking interlocutors?
2. Does incidental noticing have any effects on learners' language learning in a text-based CMC setting?
3. What characteristics of incidental noticing, if any, best predict interlanguage development in a text-based CMC setting?

Studies further indicate that the effect of noticing might not be consistent across proficiency levels. According to Schmidt (1990) and Bardovi-Harlig (1995), learners' skill and ability level can determine their readiness to notice new forms during interactions. Williams' (2001) study echoes Schmidt's claim: higher-proficiency learners

are more ready to receive the knowledge generated during LREs. The frequency of learner-generated LREs, the posttest results, and a learner's proficiency are positively correlated in face-to-face interaction data. Learners with higher proficiency outperform those with lower proficiency in both grammatical and lexical test scores. One interesting phenomenon emerges from Williams' (2001) study: lower-proficiency learners tend to pay more attention and better retain the information provided by their NES teachers, but not that provided by their fellow NNES students. Higher-proficiency students' performances in LREs and test scores, however, are not affected by the switch between NES and NNES counterparts. It is difficult to make a claim about why lower-proficiency students are more receptive to the LREs with their NES teachers. Williams suspects the reason to be the much higher quantity of corrective feedback on error given by NES teachers than NNES fellow students. Lower-proficiency learners might need this type of input in LREs more than do higher-proficiency students. In short, the importance of NES' feedback and noticing could vary with L2 learner's proficiency levels. However, more research is necessary before conclusions can be reached regarding the relationship between the two factors.

Because a CMC environment allows learners more time to process input and output in written form and a more relaxing milieu, it is possible to hypothesize that noticing during online interactions might equally benefit both high- and low-proficiency learners. In other words, lower- level learners might be able to perform better in a CMC setting than via an oral/aural mode of communication. In other words, the discrepancy between the performance of higher- and lower-proficiency students could diminish, if

not disappear. Therefore, the current research will address the following research questions in Chapter III which includes the variable of language proficiency and its effect on noticing:

1. Do learners of different language proficiency levels similarly notice the gap in their interlanguage during negotiation of meaning in text-based CMC?
2. Does incidental noticing have similar effects on subsequent SLA of learners of different proficiency levels?
3. What characteristics of incidental noticing (LREs), if any, best predict interlanguage development of learners at different proficiency levels during text-based CMC?

DEFINITION OF TERMS

Telecommunication: In this study, computer-mediated communication (CMC) is used interchangeably with telecollaboration and telecommunication. The CMC in this study refers to synchronous textual and dyadic interactions.

Synchronous computer-mediated communication: A format in which users interact with each other in real time in front of computers. In this study, synchronous computer-mediated communication refers to instant messaging (IM) (via AIM/MSN/Yahoo Instant Messenger). All of these IM agents are freeware; i.e., users can download and use the programs for free.

Noticing: Noticing refers to a learner's awareness of linguistic knowledge through which input is processed from short-term memory to long-term memory, where the

acquisition takes place (Cross, 2002; Torlaković & Brook, 2002). In this study, noticing occurs when learners naturally and incidentally focus on linguistic items during negotiation of meaning, without a pre-planned agenda (Ellis, 2001).

Language-related episodes (LREs) are operationalized to analyze the construct of noticing.

Interlanguage: The type of language produced by nonnative speakers in the process of learning a second or foreign language.

Meaning negotiation: Modification of interaction that occurs when interlocutors anticipate, perceive, or experience difficulties in mutual comprehension and then attempt to resolve them (Pica, 1994).

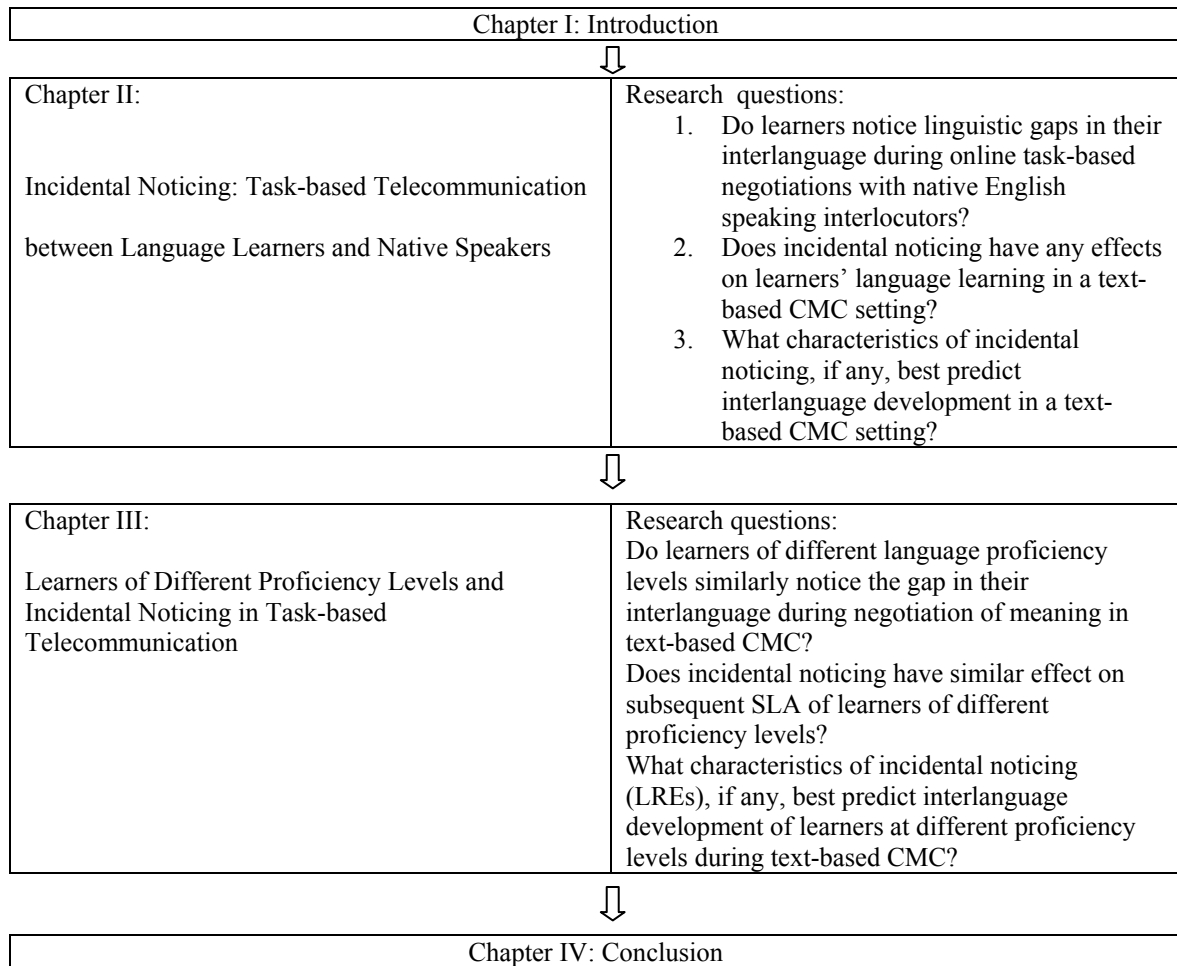
Task-Based Language Learning (TBLL): It is a L2 learning approach under Interactionist account, "in which learning is organized around tasks related to real-world activities, focusing the students' attention upon meaning and upon successful task completion (Cook, 2003, p. 37)."

ORGANIZATION OF THE DISSERTATION

This dissertation contains four chapters: the introduction (Chapter I); incidenta; noticing: task-based telecommunication between language learners and native speakers (Chapter II); learners of different proficiency levels and incidental noticing in task-based telecommunication (Chapter III); and the conclusion (Chapter IV). Noticing in online interaction between native and nonnative speaking peers and the effect of the learners' language proficiency were the two major foci of this study. Therefore, two independent

articles in Chapter II and Chapter III, respectively, discuss these two major issues and provide an in-depth analysis of the major findings.

FIGURE 1.1
Organization of the Dissertation



CHAPTER II

INCIDENTAL NOTICING: TASK-BASED TELECOMMUNICATION BETWEEN

LANGUAGE LEARNERS AND NATIVE SPEAKERS

OVERVIEW

This study investigated L2 learners' incidental noticing in a text-based CMC context. Sixteen Taiwanese college students (nonnative English speakers: NNEs) collaborated dyadically with sixteen American college students (native English speakers: NESs) on two learning tasks for two months. The results showed that the CMC context enhanced noticing and subsequent L2 development. Through NNEs' interactions with NES peers via chat agents, NNEs obtained immediate feedback on their hybrid (semi-written and semi-spoken) language output. Text-based CMC helped learners become more aware of their linguistic problems during language-related discussions with their NES counterparts, which provided opportunities to improve their interlanguage. The outcomes of statistical analyses suggest that the quality of meaning negotiation (successful uptake) and the type of feedback (NESs' elicitations and explicit feedback) were two major factors for NNEs' accurate grammatical and lexical knowledge recall. Therefore, the use of CMC and NES involvement are both recommended to classroom practitioners and language learners based on the findings of this research.

INCIDENTAL NOTICING

The process of gaining knowledge from input and then incorporating it into new output requires noticing as an intermediate step. During this step, learners pay attention

to language features (intake), compare the new information with existing information, internalize it as implicit or explicit knowledge (integrating), and finally retain it as for improved output (i.e. “pushed output” [Swain, 2000, p.99]) (Ellis, 1997, Gass, 1997). Explicit knowledge (which is declarative, or focused on “knowing what”) and implicit knowledge (which is procedural, or focused on “knowing how”) are interwoven and mutually supported, enabling learners to simultaneously attend to meaning and form when composing their L2 (second language) utterances. As shown in Figures 2.1 and 2.2 (Ellis, 1997, pp. 119-123), noticing is a necessary operation before the occurrence of second language acquisition (SLA).

FIGURE 2.1
The Process of Learning Implicit Language Knowledge (Ellis, 1997, p. 119)

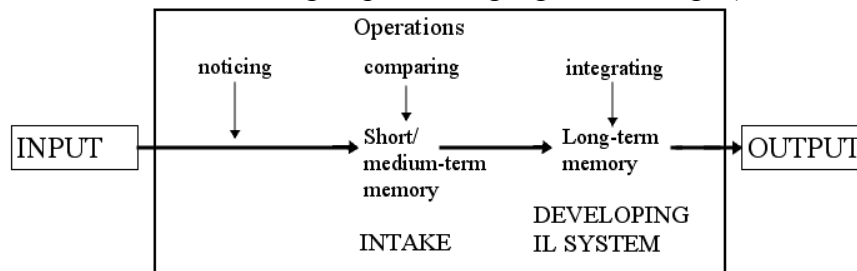
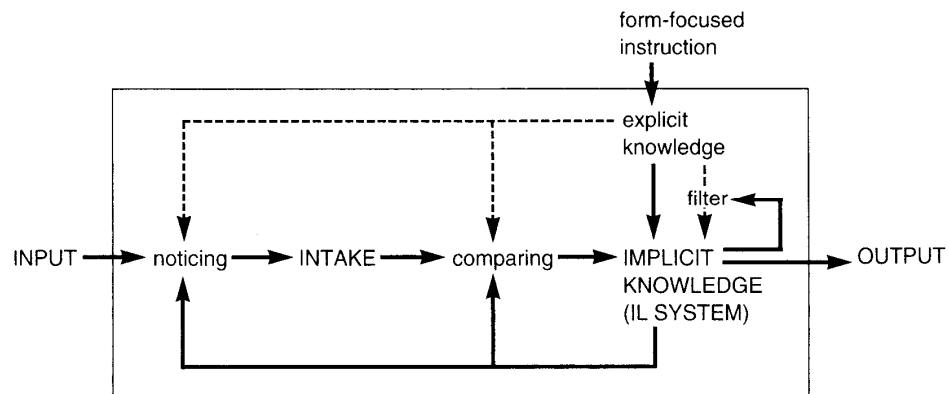


FIGURE 2.2
The Role of Explicit Knowledge in L2 Acquisition (Ellis, 1997, p. 123)



Nowadays, form and meaning are believed to be equally important in L2 learning. Ellis (2003) and Long (1991) both promote a task-based language learning (TBLL) approach that integrates meaning-focus and form-focus instruction. Several studies support the efficiency of this approach by presenting solid evidence that learners are likely to produce more utterances for meaning negotiation and improve their interlanguage under this type of instruction in both computer-mediated communication (CMC) and face-to-face settings (Doughty & Pica, 1986; Fernandez-Garcia & Martinez-Arbelaiz., 2002; Gass & Varonis, 1985; Keller-Lally, 2006; Long, 1983a, 1983b; Smith, 2003a, 2003b, 2004).

NOTICING AND TEXT-BASED CMC

The interactive nature of text-based CMC, like face-to-face communication, facilitates authentic human interaction with visual support (text on a computer monitor)

and authentic materials (everyday English provided by the interactants) and thus is considered empowering in classroom learning activities. In particular, online chat simulates face-to-face encounters but without the potential stress caused by behaviors such as frowning or staring. In addition, CMC gives learners sufficient time to process input and craft their output more accurately. In other words, CMC serves as a “thinking device” that allows learners to self-edit language forms or simply clarify their thoughts (Warschauer, 1996, 1997). Most importantly, real-time written conversations through a chat agent retain the authenticity of verbal language, which may help prepare learners for face-to-face interaction in the target language (Hudson & Bruckman, 2001).

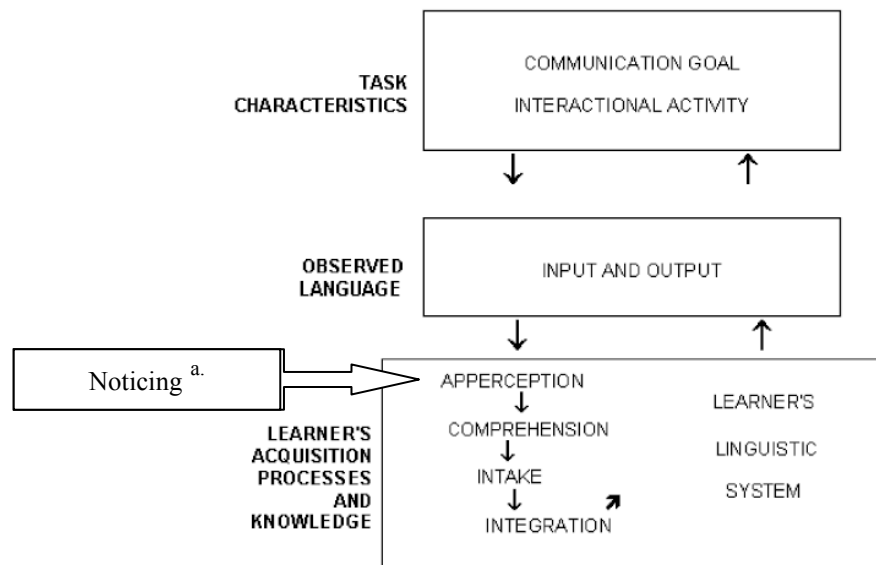
Beauvois, in her case study (1992), concluded that online interactions are like “slow-motion” conversations that enabled her subject, a French-language learner, to improve substantially compared to conventional classes, because online interactions allowed greater topic matter exploration, more opportunities for self-correction, more original utterances, and greater grammatical accuracy. CMC’s features coincide with SLA theories regarding how learners process input and acquire knowledge online. CMC context should therefore facilitate noticing (by increasing learner’s linguistic awareness) and subsequent L2 learning. Ellis (1997) claims that learners cannot process all the input (whether from a teacher, classmates, or online interlocutors) without consciously noticing the unexpected or “unusual features” embedded in the input (p.120). In other words, without this prerequisite operation, learners could miss the opportunities to engage in meaning negotiation and reassess their linguistic understanding. In this sense, the CMC context clearly can facilitate SLA.

Given these capacities, the use of CMC increases the possibility of promoting the effectiveness of a TBLL (Fernandez-Garcia & Martinez-Arbelaz., 2002; Smith, 2003a, 2003b). Learners use a hybrid (semi-written and semi-spoken) language format to exchange information via a chat agent while working together toward a specific goal, such as solving problems. However, the spontaneous input-output process between interlocutors via CMC does not necessarily guarantee SLA without learners' noticing their linguistic problems (Hegelheimer & Chapelle, 2000; Schmidt, 1990). Chapelle (1998) specifies that computer-assisted language learning should be designed for the purpose of input enhancement, through which learners are directed to notice errors in their own output and attempt to produce more target-like utterances, especially with the help of "negative evidence" (i.e. corrective feedback) (Gass, 1997, p. 37) or "reactive response" (Loewen, 2002, p. 32). Through incidental noticing, learners solicit feedback from their counterparts through which they become able to comprehend semantic and syntactic levels of linguistic input (Chapelle, 1998; Long, 1991). SLA is more likely to occur during interlocutors' meaning negotiation about problematic linguistic items during CMC than face-to-face interactions. In his output hypothesis, Swain describes this process as learners' finding and "filling holes in their interlanguage" (as cited in Williams, 2001, p. 326) while reconstructing detailed texts. Smith (2003a; 2003b) evaluated the learning outcome of 14 college-level ESL² students who participated in a synchronous text-based CMC study. The results showed that the learners were able to resolve 95 % of nonunderstandings caused by lexical, syntactic, discourse, and content

² ESL is the acronym of English as a Second Language. ESL learners use English in their everyday life, both in school and beyond, and interact daily with native English speakers.

problems. Smith asserts that the online environment elicits output and compels learners to bring negotiations to specific closure. In short, incidental noticing is natural and comprehensive in the sense that learners can overtly notice individuals' problematic linguistic items without interrupting the communication flow in either a CMC or face-to-face setting.

FIGURE 2.3
SLA Model (Chapelle, 1998, p. 25).



- a. The apperception step is equivalent to noticing, a technical term used by Schmidt (2001)

TBLL and two-way CMC share the theoretical base of the Interactionist theory. Under this theory, learners receive comprehensible input and respond in the target language, consciously selecting or experimenting with lexical items or communication

strategies to elicit as well as deliver more information to their counterpart (Peregoy & Boyle, 2005). Language is thus naturally acquired through input and output: receiving input from interlocutors, noticing language features, decoding the information for comprehension, consciously processing the language, and integrating new knowledge into existing knowledge (i.e. building a connection between old and new knowledge), storing selected items in one's memory system, and finally, sending messages in response (output), through which SLA may occur (Chapelle, 1998) (Figure 2.3). CMC should amplify this learning effect through textual stimuli and thus reinforce a learner's short- and long-term memory retention in SLA (Ellis, 1997).

The high level of compatibility and relevance between text-based CMC and TBLL has been widely tested. However, the impact of incidental noticing remains inconclusive. The aforementioned conceptual and descriptive research does not offer solid evidence showing the measurement of subsequent SLA influenced by learners' noticing in an online context. Despite the obscure nature of noticing as a cognitive process, more empirical studies on the occurrence of incidental noticing and its impact on language learning are needed.

In addition to the learning medium, the source of input (interlocutors) is considered another key factor in effective language learning (Gass, 1997; Gass & Varonis, 1985). CMC's technological capacities give learners access to native speakers (NESs) of the target language by eliminating the obstacles presented by geographic distance. Some studies emphasize NES' impact when using a modified discourse (i.e., "foreigner talk discourse" [Long, 1983b, p. 131]) or communication strategies used to

create greater comprehension by NNEs (Long, 1983b; Pica, 1988; Schwienhorst, 2004). NES' mastery of their first language is particularly important when the NNEs are of lower proficiency. The less-proficient L2 learners in Williams' research (2001) were reported to be more receptive to NES teacher's explicit and immediate feedback than that of their more-proficient fellow students (nonnative English speakers: NNEs). While these studies report that NES interlocutors are irreplaceable during language learning by NNEs, other studies have found that a high level of language improvement can also occur through online collaborations among learners (Fernandez-Garcia & Martinez-Arbelaiz., 2002; Shekary & Tahririan, 2006; Smith, 2003a, 2003b, 2004). Two conclusions are presented in the NNE-NNE studies: 1) NNEs tend to be less anxious when conversing with NNEs than with NESs; and 2) indirect and equitable contact between participants reduces participants' anxiety caused by differing levels of proficiency or social or gender status (Shin, 2006; Warschauer, 1996, 1997). These inconsistent findings imply that additional research is required in the area of NES' role in L2 teaching and learning (Levy & Stockwell, 2006; Mahboob, 2004).

ASSESSMENT OF NOTICING AND SUBSEQUENT SLA

Swain (2000) suggests a language testing measurement through collaborative dialogue, also known as a language-related episode (LRE: mini-dialogues in which learners discuss language or question their own language use or that of others), for assessing the effectiveness of noticing and its relation to SLA. Recent literature supports that LREs are one way to observe a learner's noticing in both CMC and face-to-face

settings (Loewen, 2005; Shekary & Tahririan, 2006; Swain, 2000; Williams, 2001). In an LRE, a dyad initiates, notices, discusses, and resolves problematic linguistic items. Generally, LRE is triggered by a language problem and concludes with a solution, centers on at least one linguistic item, and arises naturally and incidentally within the context of meaning negotiation. Each LRE has multi-dimensional characteristics (type, linguistic focus, source, complexity, directness, response, emphasis, uptake, successful uptake) which permit a more comprehensive analysis of language-related discussions between interlocutors. As a research tool, LREs are operationalized to analyze the construct of noticing so that noticing becomes an overt cognitive process within collective dialogues (Shekary & Tahririan, 2006). By examining the content of LREs, researchers can identify learners' language problems that can be used as data for a pretest. Ellis (2001), Long (1991), and Williams (2001) further recommend assessing the effectiveness of noticing by retrieving learners' knowledge through the use of tailor-made posttests derived from the items discussed during LREs. The combination of LREs and individually customized posttests reveals a learner's actual interlanguage development through noticing.

LREs and tailor-made posttests have allowed researchers to examine the effectiveness of noticing. Loewen (2003a; 2003b; 2004; 2005) and Shekary & Tahririan (2006) further designed immediate and delayed posttests for individual learners to quantify these learners' recently acquired linguistic knowledge stored in their short-term and long-term memory. Loewen (2004) recorded 32 hours of meaning-focused lessons in 12 ESL classes. Twelve NES teachers and 118 ESL learners contributed to a total of

1,373 FFEs (focus-on-form episodes, the same as LREs). Uptake (learner responses to feedback after either an erroneous utterance or a query about a linguistic item [p.153]) occurred in 73% of the FFEs. Successful uptake, an indication of SLA development, occurred 66.1 % of the time. Three FFE characteristics were found to be significant predictors of uptake incidence: complexity, timing, and response. Furthermore, six FFE characteristics were found to be significant predictors of successful uptake: complexity, source, type, timing, emphasis, and response. Response (teacher's feedback) was the common predictor for both unsuccessful and successful uptake. In 2005, Loewen analyzed a subset of data collected from his 2004 study. Instead of using uptake or successful uptake as indicators of SLA development, he designed two rounds of tailor-made assessments (immediate and delayed) for each ESL learner. The results showed that the students were able to recall nearly 60 % of the linguistic information in the immediate test (immediately after the end of treatment) and 50 % in the delayed test (two weeks after the treatment). His findings showed that successful uptake was the strongest predictor of correct test answers. Loewen's research extended the early theoretical and descriptive studies on noticing and quantitatively confirmed learners' ability to subsequently recall linguistic feedback using incidental noticing with individualized tests. His findings also support the notion that NES teacher-NNES student incidental noticing on forms does facilitate SLA. However, his research relied heavily on NES teachers' input in LREs. For larger language classrooms, especially in EFL contexts, the number of students would make teacher feedback less practical. Most importantly, he proposed that the tension and spontaneity of oral/aural interactions

reduce learners' thinking time and hinder their access to existing knowledge. CMC, by contrast, allows learners more time to process input and output.

Later, Shekary & Tahririan's study (2006) on noticing during NNES-NNES dyadic CMC endorses Loewen's findings that successful uptake may be the strongest predictor of correct test responses in grammar-, vocabulary-, and spelling-related test items. However, more studies are still required to validate and theorize the effect of incidental noticing. The current study is an effort to contribute to the growing body of SLA scholarship under the Interactionist Account. In this study, we replaced NNES-NNES dyads (formed in Shekary & Tahririan's study) and NES teacher-NNES student interactions (in Loewen's research) with NES-NNES peer dyadic collaboration to investigate NES' impact on learners' noticing and their L2 development in a task-based and text-based telecommunication.

THE STUDY

Researchers to date have found it difficult to empirically prove occurrences of the internal physiological experience of noticing and its effect on SLA (Fotos, 1993), which is why earlier studies on noticing (Cross, 2002; Ellis, 2001; Ellis et al., 2001a, 2001b; Long, 1991; Schmidt, 1990, 2001) have been conceptual or descriptive. Still, several researchers have attempted to present empirical evidence to support the pedagogical effect of noticing in face-to-face contexts (Ellis et al., 2006; Izumi & Bigelow, 2000; Loewen, 2003a, 2003b, 2004, 2005; Schmidt & Frota, 1986). Because CMC's capacities appear to facilitate SLA, its simulation of verbal interactions should

allow the cognitive effect of noticing to be maintained during the shift from face-to-face to electronic communication modes (Lai & Zhao, 2006; Skehan, 1998).

As noted, NES' involvement in SLA and NES-NNES online interaction remains underexplored. Some studies support the significance of the NES language model and its immediate error corrections in subsequent SLA, but the NES counterpart's level of impact on the NNES learner during one-on-one task-based CMC remains unclear (Levy & Stockwell, 2006). Logically, NNESs should benefit the most when receiving the dual stimuli (textual exposures in CMC plus NES' feedback) and thus should perform much better than in the NNES-NNES CMC or face-to-face studies discussed in the literature. The present study, therefore, examines the occurrence and impact of noticing in an online setting by connecting 16 Taiwanese EFL (English as a foreign language) students and 16 English-speaking American students in a TBLL experience via text-based chat.

RESEARCH QUESTIONS

1. Do learners notice linguistic gaps in their interlanguage during online task-based negotiations with native-English-speaking interlocutors?
2. Does incidental noticing have any effect on learners' language learning in a text-based CMC setting?
3. What characteristics of incidental noticing, if any, best predict interlanguage development in a text-based CMC setting?

METHODOLOGY

The present study employed a quasi-experimental design in order to go beyond the merely descriptive level and provide analytical depth. The main focus was to assess the possible subsequent SLA influenced by incidental noticing during online meaning negotiation.

Participants

The study involved 16 Taiwanese-American (NNES-NES) dyads³. Their age range was between 20 and 22. Both the American NESs (all females) and Taiwanese NNESs (two males and fourteen females) were students in their junior or senior year of college in either Texas or Taipei. All the NNESs had passed the GEPT⁴ beginner level in their second year of college. Before the treatment began, every NNES participant took the writing and reading portions⁵ of the GEPT intermediate level to confirm the homogeneity of the group; the entire class ranged from low-intermediate to high-intermediate (with a mean of 45/100 and a SD of 13.4). Every participant was familiar with email, instant messaging, and general MicroSoft Windows[®] applications. The Taiwanese and American students engaged in online text-based chat around 90 minutes per week to complete their two learning tasks within two months (see Appendix A).

³ Fourteen NES-NNES dyads were same-gendered (female); two dyads were mixed-gendered (NNESs were male and NESs were female).

⁴ GEPT: The General English Proficiency Test is a standardized English proficiency test that is administered throughout Taiwan. Examinees can choose the test levels based on their language proficiency. Usually they start from beginner level, proceed to intermediate level, and then move on to advanced level.

⁵ The mini test set comprises the reading and writing sections of a real test set released by the test center. The maximum score of this test set was 100.

Treatment Session

Week 1 was the orientation phase during which students' familiarity of synchronous CMC agents (AIM, Yahoo Messenger, and Windows Live Messenger [MSN]) was reinforced and ensured. The instructor assisted students as they practiced real-time chatting with their classmates. The students were later assigned randomly to their respective dyads. Meanwhile, they were given details about the project website (Appendix B), which was the primary instruction delivery medium for the two learning tasks they performed (see Appendix A). The website also contained short biographies, contact information, and photos of their overseas partners. After the orientation, the students initiated two weeks of communication and an ice-breaking activity with their NES partners. When the students from both sides felt comfortable about the cyber interaction and their net-friend, the first jigsaw task was introduced (week 4 to week 6). The second task (decision-making) was performed from week 7 to week 9, the end of the treatment period. During these eight weeks, each dyad engaged in online conversations for approximately 90 minutes per week. The immediate posttest was administrated in week 10 and the delayed posttest in week 14. The participants were informed about the posttests and about researcher's intention. However, they did not know that the posttests will be based on the LREs extracted and thus could not prepare for the tests.

TABLE 2.1
Timeline and Stages of the Treatment.

Timeline	Stages	Data Collection (16 participants total)
Week 1	Orientation	LREs in the dyadic correspondence records
Week 2-3	Ice-breaking activity	
Week 4-6	Jigsaw task	
Week 7-9	Decision-making task	
Week 10	Immediate posttest	Results from the two posttests
Week 14	Delayed posttest	

Materials

According to Long (1991), focus on form (i.e. noticing) embedded in TBLL is empirically and methodologically proven to be one of the most comprehensive instructional tools for helping students spot and correct linguistic problems. His claim coincides with Swain's Output Hypothesis (2000) and Schmidt's Noticing Hypothesis (1990). Therefore, TBLL was the instructional framework used for the online collaboration between NES and NNEST participants in the present study.

Furthermore, the researcher crafted the tasks based on Bardovi-Harlig's (1995) and Chapelle's (1998) suggestion to raise communicative need, which was expected to elicit more interactions between interlocutors and increase the likelihood of noticing. Concept identification is thought to serve this function by retrieving a wider range of lexical knowledge from learners (Skehan, 1998). Swain (2001) also advocates socio-cultural factors that foster dialogue between interlocutors. Therefore, culturally-related concept identification is embedded in the study's two learning tasks. Moreover, the jigsaw and decision-making task types are also assumed to draw more L2 meaning

negotiations (subsequent input and output) from interlocutors (Gass, 1997; Pica, 1987; Smith, 2001). The discussion topics of the jigsaw and decision-making tasks were “self-value” and “environmental protection”— prominent but arbitrary issues that students in both nations encounter daily.

Coding of LREs

Each dyad’s LREs were identified in their eight-week online chatscripts.⁶ LREs are considered a valid and comprehensive measurement of students’ linguistic knowledge (Swain, 2001). Five hundred and five LREs were coded and categorized (see Table 2.2) into nine characteristics: type, linguistic focus, source, complexity, directness, emphasis, response, uptake, and successful uptake (see Table 2.3 for an example).

TABLE 2.2
Characteristics of LREs (Sourced and adapted from Shekary & Tahririan (2006, p. 562))

Characteristics	Definition	Categories
Type	When an LRE is instigated	Reactive: Error correction Preemptive: NNES-initiated query
Linguistic focus	Linguistic target	Grammar Vocabulary Spelling
Source	The reason to instigate an LRE	Code: Inaccurate use of linguistic item with no apparent miscommunication Message: Problem understanding meaning
Complexity	Length	Simple: Only one response move Complex: More than one response move
Directness	Explicitness of the feedback	Indirect: Implicit (e.g., recast or repetition) Direct: Explicit (e.g., metalingual explanation)
Emphasis	Combination of complexity and directness	Light: Indirect and simple Heavy: Direct, complex, or both
Response	Type of feedback provided by the NES	Provision: NES gives information about a language form Elicitation: NES attempts to draw out from NNES a language form or information about a language form
Uptake	NNES response to feedback	Uptake: NNES produces response No uptake: NNES produces no response
Successful uptake	Quality of student response	Successful uptake: NNES incorporates linguistic information into production or shows solid evidence of understanding Unsuccessful uptake: NNES does not incorporate linguistic information into production

⁶ Data collection started during the ice-breaking activity (Week 2).

In accordance with the coding scheme and the definitions of characteristics of the LREs suggested by both Loewen (2005) and Shekary & Tahririan (2006), the LRE⁷ in Table 2.3 shows that an NNES' misuse of the word *cruel* temporarily caused nonunderstanding by the NES counterpart. When nonunderstanding occurs, an immediate act of meaning negotiation is necessary to help both interlocutors stay in synch, resolve the confusion together, and resume the main discussion (Gass, 1997). The NES first sought clarification from the NNES, and then the NNES rephrased her answer and added more information to make herself understood. Therefore, this LRE is *reactive* on the part of the NNES. Meanwhile, the LRE focused on the word *cruel*, so the linguistic focus fell under *vocabulary*. The meaning of the problematic linguistic item impeded communication; the reason for the initiation of this LRE was *message* as opposed to code (grammar). More than one response moves were required to resolve the communication breakdown, making it a *complex* LRE. In addition, the NES gave an explicit explanation, which makes it *direct* feedback. The NES gave complex and direct explanations, which made the LRE more noticeable to both interlocutors, and therefore this LRE showed a *heavy* emphasis on the problem trigger and resolution. The discourse move in this LRE was directly from the NES to the NNES while *eliciting* a specific piece of information (*What do you mean by cruel?*) without directly offering the correct word choice to the NNES initially. Finally, the NNES was receptive of the NES' explicit

⁷ All of the LRE examples provided in the manuscript come from the data collected for the current research. The examples provided reflect the texts used in chats, i.e. no changes have been made. However, the NNES participants' and their counterparts' names have been replaced with pseudonyms.

feedback. Not only did she achieve the *uptake*, but the uptake was *successful*—she incorporated the NES' input into her new output. Meaning negotiation was thus accomplished and the task-related discussion between the interlocutors continued.

TABLE 2.3
Example of Coding Scheme

	Characteristics	Category
Jolie (NNE): <i>He keeps getting cruel.</i>	Type	Reactive
Jolie: And then one day, I just couldn't bear it anymore.	Linguistic focus	Vocabulary
Mary (NES): <i>What do you mean by cruel?</i>	Source	Meaning
Jolie: So I just threw all his clothes that he put in my room back to his room furiously.	Complexity	Complex
Mary: Haha...did he learn his lesson?	Directness	Direct
Jolie: And we yelled at each other.	Emphasis	Heavy
Jolie: <i>He's mean definitely. And he likes to take my things without asking me first.</i>	Response	Elicitation
Jolie: <i>He's always mean and stuck-up.</i>	Uptake	Uptake
Mary: <i>I think rude would be a better word to describe your brother.</i>	Successful uptake	Successful
Jolie: <i>Got it. Yes, he is very rude to me and my parents all the time.</i>		
The matching suppliance test item:		
<i>I don't like my boss; he is really r_____ to his employees. He talks down to us, raises his voice and asks us to do extra work few minutes before we get off the work.</i>		

Posttests and Scoring of Test Responses

After eight weeks of correspondence, two posttests (immediate and delayed) were tailor-made for each Taiwanese learner based on the items each dyad had discussed in LREs. This served as a quantitative index of learners' interlanguage improvement (Loewen, 2005; Shekary & Tahririan, 2006; Swain, 2001) after the treatment. Three linguistic aspects were covered: suppliance, correction, and spelling.

A suppliance test was used primarily for the vocabulary-related LREs, such as the example in Table 2.3. These tests required learners to provide a particular definition or meaning for the problematic word choice, idiom, or phrase. For the correction test items, the NNEs improved sentences they had produced incorrectly during interactions with their net-partners. For the spelling test items, NNEs students were required to identify the correct spellings of the words that appeared in the LREs. The students' answers to the test items were coded into the three categories: (1) correct (the response matched the targeted item in the tested LRE; e.g., LRE1 and test item 1), (2) partially correct (the response was acceptable or improved but did not fully correspond to the original discussion in LRE (Loewen, 2005); e.g., LRE2 and test item 2), and (3) incorrect (the response showed that the NNE failed to reproduce the targeted item in the LRE; e.g., LRE3 and test item 3). The following three LREs are real examples found in the data;

LRE1:

Jackie (NES): Well, the first picture is of the lady in the dress with two strings. Women used to wear items called corsets. The corsets would be tied so tightly that sometimes their ribs would be broken. They did this in order to have an *hour glass shape*. Have you heard of this term before?

Sara (NNE): I've seen that before.

Sara: But I don't know why they did that.

Jackie: They wanted to impress the men and at that time small waists and curvy hips were in fashion. I can't imagine wearing one myself.

Jackie: I don't do well with pain!

Sara: *What is **hour glass shape**?*

Jackie: *hour glass shape is when women try to make their waists as tiny as possible and then their hips are curvy and larger.*

Sara (NNES): that must be uncomfortable

Jackie (NES): I know! I cannot even imagine it!

Suppliance test item 1:

What is an "hour glass shape" when people describe women?

Correct test response (i.e. the linguistic issue was accurately recalled):

Women who have tiny waists and curvy and larger hips.

LRE2:

Dan (NNES): I think there are quite a few people *looking him as* an environmental warrior.

Jamie (NES): *looking AT him.*

Jamie: Yes he is.

Dan: *You mean I should use AT not AS?*

Jamie: *No it should read "I think there are quite a few people looking at him as an environmental warrior."*

Dan: Oh, I see.

Jamie : Ok

Correction test item 2:

Please find an error in the following sentence.

Why are people looking me today? Did I dress funny?

Partially correct answer (i.e., the answer did not reflect the issue discussed in the LRE but was grammatically and semantically acceptable):

Why are people looking for me? Do I dress funny?

LRE3:

Jackie (NES): Even though I may never be famous someday I know that the people who I look up to would think of me as an important aspect of their lives, and that is all I can ask for.

Sara (NNES): *I agree that.* And people around us are also important to us

Jackie: *What do you mean by “I agree that?” Do you mean you agree too?*

Sara: Yes.

Correction test item 3:

There is an error in the following sentences. Please correct it.

A: I think it is important that we respect ourselves.

B: I agree that.

Incorrect test response (the respondent repeated the same error discussed in the LRE.

The focus is on the use of *too* to reflect the agreement reached between Jackie and

Sara.):

I agree it.

The first assessment was an immediate test administered as soon as the treatment concluded in week 10. The delayed assessment was administered in week 14. To avoid a duplication of items in the immediate and delayed test, the immediate test focused on the first half of the treatment and the delayed test covered the second half. A total of 425 LREs were tested (84 % of the total LREs produced). The LREs in which the NES-NNES dyads could not reach resolution on their linguistic issues (16%) were omitted.

Data Analysis

Following the identification of LREs and their characteristics, frequency counts were used in order to answer the first research question: Do learners notice linguistic gaps in their interlanguage during online task-based negotiations with native-English-speaking interlocutors.

The second research question—Does incidental noticing have any effect on learners' language learning in a text-based CMC setting?—targets the possible impact of noticing on subsequent language learning (i.e. posttest performance). Therefore, a chi-square analysis (with a two [immediate and delayed tests] by three [correct, incorrect, and partially correct test answers] crosstab table) was performed to examine the relationship between the frequency of LREs and the correct test responses in both the immediate and the delayed posttests. The significance level for all the chi-square tests was set at $\alpha = .05$. All inferential statistics were performed using SPSS 15.0.

To address the third question—What characteristics of incidental noticing, if any, best predict interlanguage development in a text-based CMC setting?—three logistic regression analyses were needed to present the best-fitting model to describe any

relationship between the dependent variable (test responses) and the independent variables (the nine characteristics of LREs) (Table 2.4). In logistic regression, the dependent variables are binary or dichotomous ($y=0$, $y=1$), which fits the coding scheme in this study (Table 2.4). In this case, the regression modeling helped determine which characteristics of LRE would best predict correct responses in the posttests. Three logistic regressions were performed for different categories (correction, suppliance, and spelling) for three linguistic foci (grammar, vocabulary, and spelling). The findings helped generate an empirical answer to Question 3. Each independent variable was added to the regression model step-wisely (forward selection procedure). Each step added the variable that resulted in the greatest change to the model. When a variable did not significantly contribute to the model, it was excluded.

Given that logistic regression allows only binary data, the dependent variable (the test scores in this study) needed to be dichotomized (incorrect=0, correct=1) (Ott & Longnecker, 2001). Therefore, correct and partially correct answers were combined for this part of analysis since both types of responses represented a certain level of learning. Additionally, assigning binary values to the independent variables (Table 2.4) resulted in odds ratios and allowed for easier interpretations. The framework used for the analysis was mainly adopted from Loewen (2002, 2004, and 2005). The output of a logistic regression analysis includes odds ratios and 95 % confidence intervals for each odds ratio. Odds ratios (ORs) generated by such statistical measures indicate the approximate likelihood of the outcome to be among those with $y=1$ than among those with $y=0$. The greater the ORs, the better predictor a particular independent variable is (Hosmer &

Lemeshow, 2000). But a negative relationship between two variables produces an odds ratio of <1.0 , and the smaller the odds ratio, the stronger the negative relationship. Loewen's (2005) and Shekary & Tahririan's (2006) studies were chosen for comparison because no other study has used binary logistic regression to identify powerful LRE-related predictors to subsequent SLA. It should be noted that contextual factors and differences are influential in this type of study (Ellis, 2001). Loewen's study was conducted in a classroom setting (NES teachers-NNES students in a face-to-face setting) in a language school, and Shekary & Tahririan's was in a language institute (NNES-NNES online interactions). However, the present study connected two students groups from two different colleges in two different countries (NES-NNES) via online chat agents. Students had to overcome the 14-hour time difference and often interacted outside of school. Even though each dyad was given the explicit instruction about 90-minute chat time per week, their interaction time and technology-related difficulties could not be fully controlled.

TABLE 2.4
Binary Variables of Logistic Regression

Variable	Value=0	Value=1
Test score	Incorrect	Correct
Type	Reactive	Preemptive
Linguistic focus ^a	--	--
Source	Code	Message
Complexity	Simple	Complex
Directness	Direct	Indirect
Emphasis	Light	Heavy
Response	Provision	Elicitation
Uptake	No uptake	Uptake
Successful uptake	Unsuccessful uptake	Successful uptake

^a Not reducible to a binary distinction.

Reliability of Coding and Testing

The researcher of the present study coded 512 LREs. To estimate the inter-rater reliability of the coding, a sample of 50 % of the data was coded by both the researcher of the study and the instructor of the Taiwanese participants. The kappa coefficients for LREs coding was $k=.95$.

After coding the LREs, the researchers constructed test items for each NNEs related to the linguistic items targeted in the LREs. Following Shekary & Tahririan's (2006), three test item types were used (correction test type was used for grammar-related LREs, suppliance test type for vocabulary-related LREs, and spelling test type for spelling-related LREs). Because obtaining the reliability of the individualized testing was impossible in a conventional sense (e.g., testing and retesting for internal consistency), construct validity (suggested by Loewen (2005)) was chosen to ensure the suitability of the test items designed for the present study. The aim was to verify that the test items actually measured a learner's ability to reproduce or recall the linguistic knowledge generated in the LREs.

All of the test items and the corresponding LREs were reviewed by the EFL instructors of the Taiwanese participants' class and her colleague (who was also an EFL instructor) to ensure that the test items tested the target language issues discussed in

LREs. They assessed the items and categorized them into three categories: appropriate, inappropriate, and uncertain. The agreement between the two raters was 97 %. The debatable test items (3 %) were withdrawn from the posttests.

RESULTS AND DISCUSSION

The first research question—Do learners notice linguistic gaps in their interlanguage during online task-based negotiations with NES interlocutors?—is intended to reveal the existence of NNES' noticing during synchronous CMC. As shown in Table 2.5, the 16 NES-NNES dyads produced a total of 512 LREs (with a mean of 32 and a SD of 13.2) during the two months of text-based chat (approximately 90 minutes per week), which is a clear indication of the positive answer to this research question. This result is similar to Pellettieri's findings (2000) in which the intermediate-level L2 learners of Spanish were able to initiate online meaning negotiation to discuss all aspects of discourse and also to use communication strategies to signal their peers for the need to negotiate.

TABLE 2.5

Total LREs, Total and Average Number of Words of LREs, Tested LREs, and LREs per 10,000 Words

Dyads	Total LREs	Total Number of Words of LREs	Average Number of Words of LREs	Total LREs tested	Percentage of LREs tested ^a	LREs per 10.000 Words
Dyad 1	23	1497	65.09	19	83%	22.24
Dyad 2	20	1100	55.00	19	95%	19.24
Dyad 3	30	1478	49.27	28	93%	53.82
Dyad 4	50	3645	72.90	44	88%	59.04
Dyad 5	29	2208	76.14	22	76%	45.40
Dyad 6	22	1655	75.23	19	86%	35.20
Dyad 7	19	1284	67.58	19	100%	44.36
Dyad 8	70	5010	71.57	46	66%	48.95
Dyad 9	34	2474	72.76	25	74%	31.61
Dyad 10	29	1620	55.86	28	96%	30.49
Dyad 11	23	871	37.87	21	91%	20.88
Dyad 12	26	1804	69.38	26	100%	54.16
Dyad 13	29	2417	83.34	22	76%	31.25
Dyad 14	38	2621	68.97	34	89%	38.69
Dyad 15	26	1632	62.77	23	88%	52.41
Dyad 16	44	1110	25.23	30	68%	29.42
Total/Average	512	32426	63.06	425	86%	38.57

- a. Eighty-seven LREs (16 %) were not tested in the immediate and delayed tests, because either the NES-NNES partners failed to reach conclusions about the focused linguistic issues during their online negotiations, or the appropriateness of the test items remained questionable in the inter-rater reliability test.

The context in the current research differs from those in earlier studies in that it involved NES counterparts and one-on-one peer online interaction. The number of LREs in this study (512LREs/ 12 hours⁸ during two months)—compared to Shekary &

⁸ All the NESs and NNEs interacted with each other outside of class; the chat agents, the setting, and the interaction time were not fully controlled. Hence, the 12 hours were an estimation of the total time each dyad spent interacting online. For instance, each dyad developed different level of partnership and often interacted with their NES counterparts longer or shorter than the required time (which was a 90-minute

Tahririan's study (2006) (718 LREs/125 hours during NNES-NNES online interaction during one month) is noteworthy. The major difference between the two studies is that in the current study NES-NNES interactions occurred in a less controlled non-classroom setting, while in the second study NNES-NNES CMC took place in a fully controlled classroom setting. In two-way communication for the purpose of language learning, many variables (e.g., learning tasks, discussion topics, the choice of NES/NNES counterparts, language proficiency, the familiarity between the interlocutors, and the choice of mediums and settings) can influence communication quality and L2 learning outcome (Ellis, 1997; Loewen, 2002; Shepardson, 2002). For instance, equal amount of interaction time in face-to-face setting and CMC context does not necessarily reflect equal amount of talk in the two contexts. Therefore, the frequency comparisons of incidental noticing occurrences are hard to make since common baselines are unlikely to be established between related studies.

Additionally, the ratio of LREs to amount of talk (per 10,000 words) (Ellis et al., 2002), which seemed to be a more valid index, was calculated to be referenced by similar research in the future. As presented in Table 2.5, the ratio of LREs per 10,000 words ranged from 19.24 to 59.04 (with the mean of 38.57), which was lower than the mean ratio of 89.49 reported in Shekary & Tahririan (2006) (ranging from 56.78 to 135.98). The ratio discrepancy between the current research and Shekary & Tahririan's could be explained by the replacement between NNES interlocutors [in Shekary &

session each week). Moreover, the quality of the Internet connection and computer breakdowns were often reported as problems during the treatment. In CMC research contexts, this type of technology-related issues can lead to idle time (i.e. no interaction occurs). In other words, comparison of our study results with other studies as it related to time-related LRE frequency should be viewed cautiously.

Tahririan (2006)] and NES partners [in the present research] in the dyadic interaction. The amount of nonunderstanding tends to be greater between NNEs than between NNEs and NESs (Gass, 1997). When NESs communicate with NNEs, they tend to be more forgiving of non-critical problems—as long as NNEs' errors do not impede communication (Long, 1981, 1983b). To be more specific, NESs pay more attention to the communicative function of the language (i.e. content) than the grammaticality or the accuracy of NNEs' utterances. On the contrary, when NNEs interact among themselves, they anticipate to experience more difficulties in message comprehensibility (Pica, 1994) due to the absence of the linguistic authority (i.e. NES). Furthermore, in Gass & Varonis' (1985) comparative study, NES-NES, NES-NNE, and NNE-NNE dyads were formed. The findings showed that the amount of meaning negotiation occurring in NNE-NNE dyads is “marred by numerous interruptions” (p.73): NNEs' proficiency level leads to the frequent loss of conversational footing (i.e. losing the original direction in the conversation) and higher complexity during negotiation. NNEs' predispositions towards each other and having less tolerance for grammatical mistakes as reported by Gass & Varonis' (1985) may explain why the ratio of LREs per 10,000 in Shekary & Tahririan's research is higher than in the current study. The NES-NNE interactions in this study seem to have been much more efficient, since in approximately 12 hours of interaction they produced significantly more number of LREs than the participants in Shekary & Tahririan's study.

Nonetheless, Williams' study (1999) reported a much lower ratio of LREs to amount of talk in oral/aural interactive mode ranging in the ratio from 1.46 to 2.50 LREs

per 10,000 words. These figures evidently indicate that the ratio of LREs to amount of talk in CMC contexts far exceeded those in Williams' study, mostly likely due to CMC's unique feature as a thinking device (Warschauer, 1997). In other words, text-based CMC allows more opportunities for noticing of interlanguage gaps.

Kung (2002) argues that NES participants primarily take the roles of language models, conversation mediators, and feedback providers, as opposed to instigators of linguistic problems (often caused by NNES counterparts). The NES interlocutor, combined with the influence of CMC context, could be the reason why the NES-NNES dyads were able to generate the substantial amount of LREs in such a short time in the current study. Loewen's (2005) investigation of face-to-face classroom interactions between 12 NES teachers and 118 NNES students from 12 intact ESL classes during 32-hour observations, resulted in a total of 473 LREs. The total number of LREs in Loewen's seems to be lower than the number reported in the current study.

In short, the results in Table 2.5 show that the learners in the present study noticed linguistic problems in their interlanguage during online task-based chat with NES interlocutors. The findings of the current research resonate with Loewen (2002, 2004, 2005), Williams (2001) and Shekary & Tahririan (2006), in terms of NNES' ability to notice linguistic gaps in their interlanguage during online task-based negotiations with interlocutors. The noticing effect obviously has sustained across many different contexts: NES-NNES peer interaction, NES teacher-NNES student interaction, face-to-face setting, and CMC. In addition, the balanced numbers of grammar-related and vocabulary-related LREs (257 code-related vs. 255 message-related) indicated that

the communicative tasks successfully integrated form-focus and meaning-focus instruction.

To address the second question which focused on the effect of incidental noticing in a text-based CMC setting, a total of 425 LREs (out of 512) were tested (Table 2.6). One hundred and eighty (42 %) were tested two days after the completion of the treatment (immediate test), while 245 (58 %) were tested three weeks after the end of the treatment (delayed test). Eighty-seven LREs (16 %) were not tested in the two posttests, because the NNEs and NESs failed to reach conclusions about the focused linguistic issues during their online negotiations, or the two test item raters categorized the items differently. On average, each NNEs was tested about 86 % (Table 2.5) of the LREs produced as a unit of a dyad.

TABLE 2.6
Test Results

Test Responses	Immediate		Delayed		Total	
	N	%	N	%	N	%
Correct	126	70.0	174	69.3	300	70.6
Partially Correct	13	7.2	20	8.1	33	7.8
Incorrect	41	22.7	51	20.8	92	21.6
Total	180		245		425	

The descriptive statistics in Table 2.6 indicate that NNEs were not only able to notice their language problems in LREs, but also retained the information related to the problematic linguistic issues. The students demonstrated knowledge intake by correctly answering the majority of the tailor-made test items in the two posttests, the primary

assessment tool of subsequent L2 learning. The language learners were able to correctly recall and reproduce 70 % of the target linguistic items in immediate test and 69.9 % in the delayed test. Partially correct responses were about the same between the two posttests (7.2 % vs. 8.1 %). Finally, the incorrect answer rates were 22.7 % and 20.8 % in the immediate and delayed tests. A chi-square analysis⁹ was performed to attempt to find the possible significant differences in the distribution of correct test performance between the two posttests: $X^2(2, n=425) = .318, p > .05$. The residuals showed that the differences between incorrect, partially correct, and correct responses were quite small (with the absolute values of 2.0, 1.0, and 1.1); i.e., there were not significant differences in the distribution of correct responses in the immediate and delayed tests. In other words, there was no decrease of the LRE-related memory retention over the three-week period, because the observed decrease is not statistically significant and thus likely the result of chance.

This part of the statistical outcome was similar to Shekary & Tahririan's findings (2006), which also indicates that incidental noticing is effective for subsequent SLA in both NNES-NNES and NES-NNES task-based interactions through CMC. Special attention should be given to NNESS' test performance in the delayed posttest (69 %) in the present study, which was higher than the result in Shekary & Tahririan (2006) by 12.6 %. Because the two studies have in common a text-based synchronous CMC

⁹ In order to explore the possible relationship between the two posttest results, in addition to chi-square analysis, the researcher also transformed the categorical data into numerical (ordinal) data by coding 1) correct responses as 2 points, 2) partially correct responses as 1 point, and 3) incorrect responses as 0 points. After calculating the percentage of each participant's scores (divided by his/her maximum possible scores) in immediate and delayed tests, a paired t-test analysis was conducted. The outcome ($p\text{-value} = .577, \alpha = .05$) still showed that there were no significant differences between the results of the two assessments.

context and one-on-one peer interaction approach, it is logical to assume that the different delayed test results could be associated with the NESs' involvement in the current research. As aforementioned, even though compared to our study, the results of Shekary & Tahririan's (2006) study show the ratio of LREs per 10,000 words to be higher in NNES-NNES dyads, the efficiency (amount of interaction and number of LREs in one hour) was much higher in our study. As mentioned before, interruptions and the loss of conversational footing occur more often during their communication. NESs' proficiency in their first language, on the other hand, allows them to better control the conversation flow and offer more immediate feedback and comprehensible (modified) input to their NNES counterparts (Long, 1983b). Even though some advanced NNESs could come very close to NES competence, providing the appropriate nuance in L2 when conversing with NNESs can still be challenging (Williams, 2001). Furthermore, when interacting with NESs, NNESs are likely to test the linguistic hypothesis and receive immediate feedback or confirmations from NESs (Loewen, 2005; Swain, 1998, 2000), which intensifies the effect of incidental noticing and output hypothesis. Additionally, since NNESs consider NESs as the authority with full linguistic competence, they put more trust in their feedback and may take their input more seriously.

Gass (1997) points out that the availability and type of corrective feedback are crucial for language learning through conversational interaction. When feedback is not present or sufficient, the learner's proficiency level is fossilized (i.e. "interlanguage fossilization" (Selinker, 1972, p. 215)) and incomplete understandings remain

unresolved. In the current research, NES peers offered mostly direct (explicit) explanations (67.5 %), which is the type of feedback recommended by Williams (2001) and Loewen (2002). Williams (2001) examined LREs occurring between NES teachers-NNES students and those between NNES learners. She concluded that the NES teachers, as knowledge authorities, gave more explicit corrective feedback to low-language-proficiency students than did NNES advanced learners. Lower-proficiency NNESs meanwhile appeared to be more receptive of the knowledge from the NES teachers. In Loewen's study (2004), direct feedback from NES teachers was also found to result in successful uptake by more learners. Porter's findings (1983) also endorse NES-NNES interactions. She calculated the frequency of interactions generated by the mix of NESs and NNESs of Spanish. The interactions between NES-NNES dyads quantitatively exceeded those between NNES-NNES dyads. Her reasoning was that NESs' mastery of their first language enabled them to draw learners' attention to problematic utterances. Chapelle (1998) and Gass (1997) assert that NES' involvement facilitates and reinforces a learner's apperception (i.e. noticing), comprehension, intake, and integration, which generates positive impacts on NNESs' long-term memory retention. In the current study, the NNESs not only performed well on both the immediate and delayed tests—which confirm the effect of noticing in CMC—but their test performance in the delayed test exceeded the learners' test scores in other studies. These empirical studies indicate that NES participation enhances NNES' L2 development and learning outcome.

The third research question—What characteristics of incidental noticing, if any, best predict interlanguage development in a text-based CMC setting?—is answered by

using three binary logistic regression analyses with the dependent variable (posttest scores) and independent variables (nine LRE characteristics). To increase the sample size of tested LRE items and the test results for logistic regression, the immediate and delayed posttest results were combined. Through logistic regression, the most significant variable(s) with the highest odd ratios (ORs) served as the best predictor(s) of NNEs' L2 improvement. All predictors (p-value <.05) entering the respective models (overall [uncategorized], correction, and suppliance test types) are listed in Table 2.7. The most significant predictors with the highest ORs in each model are marked with asterisks (*), except for the spelling test type, for which the available sample size (n=22) was too small, and thus no claim can be made.

LRE4 (spelling-related LRE and the test item):

Tammy (NNEs): *what about the mass transportation?*

Linda (NES): *You mean transportation?*

Tammy: *Yes, we take the mass transportation to school or anywhere we want.*

TABLE 2.7
Predictors in Three Logistic Regression Models (Uncategorized, Correction, and Suppliance)

Test item type	Predictors	95% Confidence Intervals		OR	p-value
		Lower	Upper		
Overall (Uncategorized)	Response	1.166	3.312	1.965	.011
	Successful uptake	1.612	4.791	2.779*	.000
	Directness	.314	.806	.503 (1.988)	.004
Correction	Response	1.100	4.061	2.114	.025
	Successful uptake	1.096	4.420	2.201*	.027
Suppliance	Source	1.366	32.963	6.711*	.019
	Directness	.061	.665	.202 (4.950)	.009
	Successful uptake	1.883	11.869	4.728	.001
Spelling ^a	--	--	--	--	--

^a. The sample size n=22 was too small to make claims.

Note. The predictors with ORs of less than 1 were also reported in their reciprocal values (when y=0), are in parentheses. $\alpha=.05$ was chosen to be the cut-off point to exclude less- significant predictors.

As shown in Table 2.7, successful uptake entered all three models (overall, correction, and suppliance) with high ORs, especially in the first regression (overall/uncategorized) with all the 425 tested LREs as the sample size. Our findings are similar to Loewen's (2005) (in a face-to-face setting) and Shekary & Tahririan's (2006) (in CMC setting), showing that successful uptake is the strongest predictor of subsequent L2 learning. Loewen (2004, p. 154) defined uptake as "learner's acknowledgement or response to feedback after a erroneous utterance or linguistic query within the context of meaning-focused language activities". However, in other studies by Loewen (2004; Loewen, 2005), Ellis et al. (2001a), and Shekary & Tahririan (2006), higher-quality uptake (i.e., successful uptake "in which a student correctly repaired a linguistic feature or clearly demonstrated understanding of an item" [Ellis et al., 2001a, p.299]), is considered a more effective indicator of possible SLA than the mere presence of uptake (including unsuccessful uptake). Learners not only indicate awareness of the gap in their language skills, but also incorporate the knowledge gained from feedback into their language production. The result of the first regression in the current study also supports the findings in the pertinent empirical studies that successful uptake has a high OR of 2.8. This means that successful uptake increases a learner's likelihood of having a correct test response by 280 % in posttests, when other variable are held constant. Successful uptake is similar to Swain's Output Hypothesis (2000) and Schmidt's (1990; 2001) Noticing Hypothesis: learners process language more deeply and consciously and "stretch their interlanguage to meet communicative goals" (Swain, 2000, p. 99) through attending to form and meaning simultaneously. Because research in both CMC and face-

to-face contexts presents similar findings, the effectiveness of this particular predictor appears to be robust in both CMC and face-to-face studies on noticing.

In addition to successful uptake, response (elicitations [OR=1.65]) was also a strong predictor in the first regression model. This outcome coincided with Loewen's research (2004) conducted in a face-to-face setting between NES teachers and NNES learners. As shown in this study, when NESs elicited meaning negotiation from NNESs, NNESs were pushed to reconsider their problematic utterances and attempt to retrieve less-used knowledge and generate better output (see LRE 5 for an example)—transforming declarative knowledge into procedural knowledge. Lyster (2001) also explains that when teachers use this strategy, they are encouraging learners to increase their participation in meaning negotiation. In other words, using elicitations in LREs can facilitate a learner's knowledge recall. In the present study, elicitations (34.5 %) were lower than provision (65.5 %), even though they were still three times higher than those in Loewen's findings (11.8 %). In Loewen's study (2004), elicitation was also a significant predictor; however, elicitations were found in only 11.8 % of the LREs between NES teachers and NNES students in his research, which was conducted in a face-to-face setting. Loewen suspected the reason to be a teacher's preference for giving correct linguistic information promptly rather than ending LREs with elicitations—especially when under time constraint. The possible explanation for the discrepancy between the results of Loewen's study and the present research could be that when NNESs were stimulated by NES' elicitation in textual form and reviewed their previous problematic language use on the computer monitor, they were more likely to engage in

self-correction because they felt compelled to close the gap between interlocutors during online interactions due to the absence of physical appearance and facial expression of the counterparts (Smith, 2003a). Moreover, both NESs and NNEs could feel less time pressure when interacting via CMC than in face-to-face conversations, which allows more elicitation to occur (Beauvois, 1992).

LRE5 (Elicitation Response):

Katie (NNE): I think I am a good person because *I work for myself to keep the life goes on*.

Katie: is that correct?

Dolly (NES): *What do you mean by, "...I work for myself to keep the life go on,"?*

Katie: *I mean I make my own money*.

Dolly: Aha, I see. Very good self correction!

The final powerful predictor in this regression model was directness (explicit feedback [OR=1.988]). Correct responses were almost twice more (198%) likely to occur when the NESs gave direct feedback to NNEs rather than indirect feedback. Ellis et al. (2002) also promote the use of explicit feedback, noting that learners are more likely to be aware of the core of the problem when they receive clear signals or instruction from their counterparts (see LRE 6 for an example). Although implicit feedback (e.g., recast or repetition) is more commonly used by teachers in real classrooms, “students may fail to notice the difference between his/her own utterance

and the recast. This is because the corrective function of a recast is not always apparent” (Ellis et al., 2002, p.425).

LRE6 (Direct Feedback):

Katie (NNES): *It is not so good to use the plastic bags. When it burns, it may destroy the air.*

Katie: *How do you say that? Damage or destroy?*

Dolly (NES): *I would say damage.*

Katie: *Oh! I got it.*

Dolly: *Or destroy. Either one will work there. They mean different things. It depends on what you want to say. Damage means hurt or mess up. Destroy means it is no longer there.*

Katie: *Oh, thank you, Dolly. I think I got it.*

TABLE 2.8
Predictors in the Logistic Regression Model of Correction Test Item Type

Test item type	Predictors	95% Confidence Intervals		OR	p-value
		Lower	Upper		
Correction	Response	1.100	4.061	2.114	.025
	Successful uptake	1.096	4.420	2.201*	.027

In the second regression analysis on correction test type (for grammar-related LREs) (Table 2.8), another strong predictor (in addition to successful uptake [OR=2.2]) also entered the model: response (with OR=2.1), which coincides with Loewen’s study

(2004). In other words, when other variables were held constant, elicitations were 2.1 times more likely to induce correct test responses than provisions. Once again, elicitations facilitated a learner's correct test performance in grammar-related items. While NES peers use elicitations to "redirect NNEs counterparts' attention to grammatical structure used in context [of learning tasks], students can consciously perceive the underlying patterns involved" (Shaffer, 1989, p. 396). In addition, Schegloff et al.(1977) argue that elicitations enable learners to locate the trouble source and engage in self-corrections.

TABLE 2.9
Predictors in the Logistic Regression for Suppliance Test Item Type

Test item type	Predictor variables	95% Confidence Intervals		OR	p-value
		Lower	Upper		
Suppliance	Source	1.366	32.963	6.711*	.019
	Directness	.061	.665	.202	.009
	Successful uptake	1.883	11.869	(4.950) 4.728	.001

Noted. $\alpha=.05$ was the cut-off point.

In the regression analysis on suppliance (Table 2.9), source (OR=6.7) and successful uptake (OR=4.7) were the two most significant predictors. In other words, message-related LREs are almost seven times more likely to result in correct responses in posttests than code-related ones, when other variables are held constant. In fact, the suppliance test type was the construct specifically designed for vocabulary-related LREs,

which often relate more to message (lexical/semantic level) than to code (grammar). Therefore, the interrelatedness between message-related source and suppliance test type should be clear. This result supports the effectiveness of task-based CMC treatment at the semantic level. Learners have the time to contemplate word choice and formulate accurate language use by taking advantage of these attributes of CMC (Beauvois, 1992; Hudson & Bruckman, 2001) and NESs' ability to explain the target language (Kung, 2002; Long, 1983b). As the second powerful predictor, successful uptake induced almost five times of correct test responses than unsuccessful uptake, which once again endorsed the findings of other studies in face to face and CMC contexts.

CONCLUSION AND IMPLICATIONS

The results of the current research have shown that the CMC context enhanced the occurrence and pedagogical effect of noticing and subsequent L2 development. Through their interactions with NES peers via text-based chat agents, NNESs obtained immediate feedback on their language output. Text-based CMC has helped learners become more aware of their linguistic problems during the language-related discussions with NES counterparts, which provided opportunities to improve their interlanguage. The exposure to textual display, language stimuli from NESs, and authentic two-way real-time communication allowed online learners to retain the input in their memory of linguistic issues (discussed in LREs) better than in face-to-face settings or NNES-NNES interactions. Based on the results of this study, the involvement of NES peers is also an important factor to NNES' subsequent L2 development. NNES participants' high performance in both the immediate and delayed tests is an indication that NESs

facilitated NNEs' short- and long-term L2 development during one-on-one dyadic collaboration for task completion.

The outcomes of logistic regressions suggest that the quality of meaning negotiation (successful uptake) and the type of feedback (NES' elicitations and explicit responses) were two major factors for NNEs' accurate knowledge recall. If learners successfully and correctly incorporate the input (correction feedback) into their output in LREs, it is an indication of their intake, comparison, and possible knowledge internalization (retention in short- and long-term memory) and subsequent improved language production (Ellis, 1997). Strong predictors like elicitation strategy and explicit feedback suggest that classroom teachers should deliberately choose how to offer error corrections and apply more elicitations whenever possible in their interactions with students. In the case of a student-student CMC project, explicit corrections and elicitation strategy should also be presented and emphasized to the learners before the start of the NNEs-NNEs dyadic collaboration. By doing so, better language learning outcomes can be expected, especially in the areas of grammar and lexicon. In a conventional classroom setting, error corrections [from either teachers or peers] can be awkward, intimidating, or overlooked [due to the time constraint] (Holt, 1997). From the perspective of communicative language teaching, students should be encouraged and given opportunities to produce successful uptake during meaning negotiation in order to ensure their increased understanding and memory retention.

Even though cultural factors are not the major focus of this research, they should still be taken into consideration. Taiwanese, like the majority of Asian language learners,

tend to be more reserved (due to Collectivism) and passive (due to the EFL learning environment) (Katchen, 2002). Instruction incorporating CMC and peer collaboration should promote NNEs' question-raising and linguistic-hypothesis-testing in this sense, because CMC context is more learner-friendly. The NNE participants in the present study were quite comfortable and receptive of their NES peers' corrective feedback. The reasons could be related to less power distance between NES-NNE peers than between teacher and students, and less uncertainty avoidance during peer interactions as compared to teacher-fronted classroom settings (Hofstede, 1986, p. 45). During the dyadic collaborations between NES-NNE peers, the equal power discourse in the present research appeared to be more casual and conversational than the unequal power discourse that exists between teachers and students [in Williams' (2001) and Loewen's (2002)]. L2 learners were more willing to experiment with the less familiar linguistic items (Loewen, 2005) with their NES partners and expected to gain corrective feedback—without feeling embarrassed or awkward—during language-related discussions. Meanwhile, CMC also helped create an encouraging learning environment for noticing to occur due to the indirect human contact (Shin, 2006; Warschauer, 1997).

From a methodological perspective, this study adopted LREs and tailor-made posttests, in an attempt to verify the existence and effect of incidental noticing on SLA in a task-based CMC context. By examining the phenomenon of noticing through this new analytical construct, the results of NNEs' subtle learning processes through natural conversations can be made tangible. Additionally, the relationship between LRE characteristics and NNEs' test performance was also investigated. The results of this

study are consistent with those of Loewen (2005) and Shekary & Tahririan (2006). In other words, NNES' high test performance in these two studies, as well as the current research, provides empirical evidence for the feasibility of the alternative assessments of incidental noticing in both CMC and oral/aural settings.

Still, some limitations need to be addressed. All the NNES participants and their NES counterparts in the present study had to overcome a 14-hour time difference and use personal time—not class time—and their own personal computers to collaborate on the two online learning tasks. The challenge of long-distance project execution is one of the reasons that NES-NNES synchronous CMC studies are rare in the pertinent literature on noticing (Levy & Stockwell, 2006). In this case, the online collaboration was not conducted in a fully controlled setting. A more controlled experimental setting could increase the quality and the quantity of data collection. For instance, some Taiwanese students complained about technology-related failures (such as bad Internet connection or computer breakdowns) during the online chats, which had caused some loss of chat records in message archives. In addition, some dyads did not build a strong sense of partnership and hence engaged in shorter online conversations. On the other hand, some developed friendship and interacted voluntarily with each other more than once a week, even though they were instructed to perform a 90-minute session each week. All of these issues could have been avoided if the NES-NNES online interactions proceeded in a more controlled setting.

In the present study, the researcher intended to offer some empirical evidence regarding the impact of CMC and NESs on noticing in a CMC context. In the future,

comparative studies may be needed to examine across NES-NNES and NNES-NNES dyadic interactions in CMC as well as face-to-face settings. Language instructors or future researchers are encouraged to take the types of feedback into consideration in online contexts and further investigate the effectiveness of powerful predictors such as explicit feedback and elicitation. Most importantly, the quality of knowledge intake (i.e., successful uptake) should also be further investigated as a new indicator of L2 learning performance, since it has been a significant variable in the research of noticing. The issue of sustainability of noticing effect should be re-examined in a different context (e.g., the use of different mediums or mixed-gender dyads). With further examinations of these predictors, more accurate and valid predictions can be made. Moreover, the inter-relatedness and dynamics among these particular predictors may also help offer more detailed and specific pedagogical suggestions for L2 instructional styles in both CMC and classroom environment.

CHAPTER III

LEARNERS OF DIFFERENT PROFICIENCY LEVELS AND INCIDENTAL NOTICING IN TASK-BASED TELECOMMUNICATION

OVERVIEW

The current study explores the impact of L2 learner's proficiency level on incidental noticing in a text-based CMC setting. Sixteen Taiwanese college students (nonnative English speakers: NNESSs) collaborated dyadically with sixteen American college students (native English speakers: NESs) on two learning tasks for two months. The online interactions were examined to determine the potential of CMC for enhancing noticing and to investigate its effectiveness with regards to different language proficiency levels. The results show that learners of both levels were able to generate approximately equal amounts of language-related discussions and utterances, which indicate that proficiency level did not impede learners' ability to notice their linguistic gaps in interlanguage. Nevertheless, statistical results show that learners of higher proficiency outperformed the lower proficiency level students in grammar-related test items. Both groups of learners performed similarly on vocabulary-related items. Learners did not show any significant decrease in recall of the targeted linguistic information during the three weeks between the immediate and delayed posttests. This indicates that NNESSs of both proficiency levels had benefited from the textual display of natural interactions with their NES peers during task-based CMC. The double stimulus (CMC and NESs' feedback) helped raise NNESSs' linguistic awareness regardless of proficiency level. The data also suggest that successful uptake was a significant predictor

to NNEs' subsequent L2 learning in both groups, which is consistent with existing face-to-face and CMC research of incidental noticing. Explicit feedback was particularly significant to the learners of lower level. This particular type of feedback should be made highly available to the learners with lower language proficiency level in order to increase the effect of incidental noticing.

INTRODUCTION

Today, an unprecedented number of second-language (L2) classroom practitioners incorporate computer-mediated communication¹⁰ (CMC) into their teaching to provide connectivity between a wider range of speakers (native and nonnative speakers of the target language). Research shows that CMC's real-time interaction in a textual form—which simulates oral interactions—allows learners more thinking time to process incoming messages and craft L2 output (Beauvois, 1992; Chun, 1994; Levy & Stockwell, 2006; Warschauer, 1996, 1997, 2001). CMC's capacity, in other words, helps raise learners' awareness of their linguistic issues. From this viewpoint, CMC's environment is assumed to amplify the effect of incidental noticing proposed by Schmidt (1994; 2001). Noticing is considered a prerequisite for L2 development (Izumi & Bigelow, 2000; Schmidt, 1990; 2001). Without this consciousness, learners may overlook linguistic problems because of the presence of other competing stimuli during oral conversations (Gass, 1997). On the other hand, when learners consciously grasp the rules from input (i.e., explicit learning, which is learning

¹⁰ The CMC in this study mostly refers to text-based online chat—a real-time communication between two interlocutors through an electronic agent (e.g., MSN, Yahoo, AIM).

with awareness, [Schmidt, 2001]), they are more likely to compare their old knowledge to the new during meaning negotiation with interlocutors, then internalize the new information into short- and long-term memory before composing their output (Ellis, 1997). The research literature on noticing shows that noticing helps learner produce more accurate (native-like) utterances in L2 while interacting with their counterparts in a natural and meaningful context (Ellis et al., 2001a, 2001b; Ellis et al., 2006; Loewen, 2002, 2003a, 2003b, 2004, 2005; Schmidt & Frota, 1986).

Noticing has been repetitively tested in face-to-face contexts, and a few researchers also have investigated noticing in CMC contexts. Shekary & Tahririan (2006) tested the effect of incidental noticing in a text-based chat. Sixteen Persian EFL learners (eight pairs) engaged in dyadic online discussions for a jigsaw and a free discussion task over one month. Seven hundred and eighteen language-related episodes (LREs, or mini-discussions about language issues) were identified. Three linguistic aspects were examined: suppliance (for vocabulary), correction (for grammar), and spelling. The researchers found that the retention rate from LREs reached 57% in the delayed posttest (three weeks after the treatment), with a slight decrease from the immediate posttest (70.3%).

Among the characteristics (including type, linguistic focus, source, timing, emphasis, directness, response, uptake, and successful uptake) of the language-related episodes (mini-dialogues in which learners discuss language or question their own language use or that of others to observe learner's noticing), Shekary and Tahririan found that successful uptake was the strongest predictor of language acquisition progress

as indicated by the two individually customized posttests. The results of their study were consistent with Loewen's (2005), who conducted a study between teachers and learners in a classroom setting. One other empirical study is comparative research conducted in both face-to-face and CMC setting by Lai and Zhao (2006). In their study, 12 ESL learners formed six mixed-proficiency dyads to discuss two learning tasks. One was via online chat and the other was conducted in a face-to-face setting. Instead of the customized posttests as used by Loewen (2005), the researchers used stimulated verbal recall sessions as the assessment tool. Noticing and three targeted interactional feedback types (meaning negotiation, recast, and self-correction) were analyzed. CMC was proven to elicit more noticing during negotiations of meaning and self-corrections during CMC than in face-to-face interactions. The amount of recast (implicit feedback) generated during the two tasks was approximately equal in both modes. Furthermore, Lai and Zhao's research also underscored the interrelatedness of the learner's proficiency and the effect of noticing. Similar to some studies conducted on face-to-face interactions (Ellis et al., 2006; Williams, 2001), learners of lower proficiency responded better to explicit feedback during online interactions. As mentioned above, few studies have explored the impact on noticing on subsequent language learning in a text-based online chat through task-based language learning. Therefore, more research on the noticing hypothesis in CMC context is needed, and also the impact of a learner's language proficiency on the effect of noticing should be further addressed. The purpose of the current research is, therefore, twofold: first, to contribute more empirical evidence to the literature on

noticing and its effect on language learning in CMC contexts; and second, to present an analysis of learners' proficiency level and their incidental noticing during CMC.

LEARNER'S PROFICIENCY AND NOTICING

The learner's language proficiency level is an important factor affecting the quality of communication between interlocutors: the input and output requirements, strategies adapted, syntactic complexity and grammaticality of interlanguage, as well as the amount of foreigner talk required (Bardovi-Harlig, 1995; Ellis, 2001; Gaies, 1979; Gass, 1997; Long, 1983a, 1983b; Peridore, 1994; Pica, Holliday, Lewis, & Morgenthaler, 1989). In other words, a learner's proficiency can be an indicator of different levels of readiness to engage in intensive input and output exchange with his/her counterpart. The individual's "skill levels" (e.g., "automaticity of processing ability") may change the outcome of SLA (Schmidt, 1990, p. 143).

As noted above, a learner's proficiency determines the learning outcome during two-way communication, so a comparison of the performances between learners of different proficiency levels and their incidental noticing is needed to generate insights regarding the significance of this factor. Very little research has targeted a learner's proficiency level and its impact on noticing (Izumi & Bigelow, 2000; Schmidt, 1990; 2001). Under the Interactionist Account, empirical studies have found that when more than one proficiency level is involved, more-proficient learners in L2 interactions assume the role of caregivers by offering scaffolding and guidance in collaboration with their less-proficient partners (Loewen, 2003a, 2003b, 2004, 2005; Long, 1983a, 1983b;

Long, Adams, McLean, & Castanos, 1976; Pica & Doughty, 1985; Shekary & Tahririan, 2006). However, the relation of language proficiency levels to the amount of input noticed and the impact of noticing on L2 learning is not fully explored.

Porter's (1983) empirical study on 18 subjects (12 NNSs and six NSs of Spanish), included NSs and NNSs of two proficiency levels: intermediate and advanced. Intermediate learners demonstrated greater need for repair and negotiation than more-proficient NNSs during interactions. Varonis & Gass (1985) investigated interactions among NESs, high-proficient NNEs, and low-level NNEs. Their results showed that communication between NESs and high-level NNEs outnumbered that between NESs and low-level NNEs. Meanwhile, the higher quantity of negotiation indicated that NNEs strived to make themselves understood and to understand NES and NNE interlocutors, i.e., minimizing confusions. Williams (2001) also finds proficiency level to be influential to NNEs and their L2 learning during oral interactions. She found that the learners of higher proficiency are more ready to receive the knowledge generated during LREs. Her findings showed that the frequency of learner-generated LREs, the posttest results, and a learner's proficiency are positively correlated in face-to-face interaction data. Learners with higher proficiency outperform those with lower proficiency in both grammatical and lexical test scores. Lower-proficiency learners tend to pay more attention and better retain the information provided by their NES teachers, but not that provided by their peers. Whereas students with lower proficiency are more receptive to the LREs with their NS teachers, higher-proficiency students' performances in LREs and test scores are not affected by the switch between counterparts. Williams argues that the

reason for this is the much higher quantity of corrective feedback on errors given by the NES teachers than the NNEST fellow students. Lower-proficiency learners might need higher quality corrective feedback for noticing to occur than do higher-proficiency students. These findings once again underscore the impact of proficiency levels during oral/aural communications.

The disadvantages experienced by less-proficient learners engaging in a real-time conversation generally stem from a number of internal and external factors: anxiety, linguistic knowledge, the applications of communication strategies, insufficient time for information processing, and interlocutors' reactions (Chen, 1990; Krashen, 1981). As aforementioned, several studies have verified the significant discrepancy of the L2 performance between more- and less-proficient learners in face-to-face interactions, as noted. However, the pertinent literature has not covered the impact of this factor in CMC contexts, regardless of the advent of networked technology. CMC has substantially replaced in-person contact and created a virtual interactive context in many educational settings. In the past two decades, CMC has empowered language learners in many ways. For one thing, it elicits a higher amount and higher quality of L2 production from learners as compared to face-to-face interactions (Blake, 2000; Cifuentes & Shih, 2001; Kern, 1995; Warschauer, 1996). Written conversation via CMC, which mimics oral conversation, allows learners more time to process input and output while still retaining the authenticity of verbal language (Beauvois, 1992, 1997; Hudson & Bruckman, 2001). Meanwhile, the worldwide network offers learners access to NESs of the target language as well as to authentic learning materials and audiences regardless of geographic

distance (Kung, 2002; Shih & Cifuentes, 2001; Warschauer, 1997). Most importantly, CMC provides indirect and egalitarian human contact between participants, thereby reducing learners' anxiety regarding their lesser language proficiency or social/gender status (Shin, 2006; Warschauer, 1997). Schwienhorst (2004) endorsed these ideas through his findings of a synchronous text-based CMC between NESs and NNEs, the results of which showed that the amount of topic initiation and total utterances between NESs and NNEs in an online context was more balanced than in a face-to-face setting. The visibility of text-based chat serves as a thinking device that gives learners more time to notice the language forms (e.g., grammar or word choice) or clarify their thoughts in a comprehensive manner. Furthermore, accurate online correspondence records (i.e., message archives or chatscripts) enable learners to revisit their L2 production in print for the purpose of self- or peer-correction (Beauvois, 1992; Chapelle, 1998; Warschauer, 1996, 1997). Pellettieri (1999), in her study of synchronous text-based CMC discussions between intermediate Spanish-language learners, concluded that learners of this proficiency level were still able to generate native-like forms and engage in self-repairing through online negotiation. These studies suggest that CMC's capacities—especially learners' longer input-output processing time and the textual display on monitors—should benefit L2 learners of different proficiency levels. Therefore, it would be a logical assumption that the discrepancy of learning outcomes between higher and lower levels of students should be reduced, if not eliminated in an online context. Therefore, additional empirical studies focusing on noticing and subsequent language learning in online context should strengthen the scholarly literature.

THE STUDY

This study investigated the occurrence and effectiveness of incidental noticing in a text-based online setting. NNES participants of different proficiency levels were assigned to interact with NES peers and collaborate on a one-on-one basis in a task-based telecommunication. In addition, language proficiency levels were examined as one possible variable affecting the amount of noticing and its effect on subsequent language learning.

Research Questions

1. Do learners of different language proficiency levels similarly notice the gap in their interlanguage during negotiation of meaning in text-based CMC?
2. Does incidental noticing have similar effect on subsequent SLA of learners of different proficiency levels?
3. What characteristics of incidental noticing (LREs), if any, best predict interlanguage development of learners at different proficiency levels during text-based CMC?

METHODOLOGY

Participants

The study involved two NES-NNES dyadic combinations: lower-intermediate learners interacting with NESs (eight pairs) and higher-intermediate learners interacting

with NESs (also eight pairs). All the participants¹¹—American NESs (16 females) and Taiwanese NNEs (2 males and 14 females)—were junior or senior students from two colleges in Texas and Taipei.

All the NNEs came from the same class [with 34 students in it]. Their age range was between 20 and 22; they all majored in Applied Foreign Languages and were enrolled in the Children's Literature course. All the students had passed the GEPT¹² beginner-level test in the second year of college. To determine NNEs' English proficiency level, every NNE took the writing and reading portions of the GEPT intermediate-level test¹³ before the treatment began. The average of the test score of the entire class was 45 (out of 100) with a SD of 13.4. For the purpose of investigating the impact of proficiency level as a major factor in relation to noticing, the researcher chose to include those who scored lower than 1 SD below the mean and considered them as lower-intermediate level (eight students; one male and seven females). Those who scored 1 SD above the mean were also included and considered as high-intermediate (eight students; one male and seven females) (see Figure 3.1). The students whose scores fell within 1 SD from the mean were not included. Additionally, a t-test analysis was conducted to confirm a significant difference between the test scores of the students in the two proficiency level groups ($p\text{-value} = .00 < .05$).

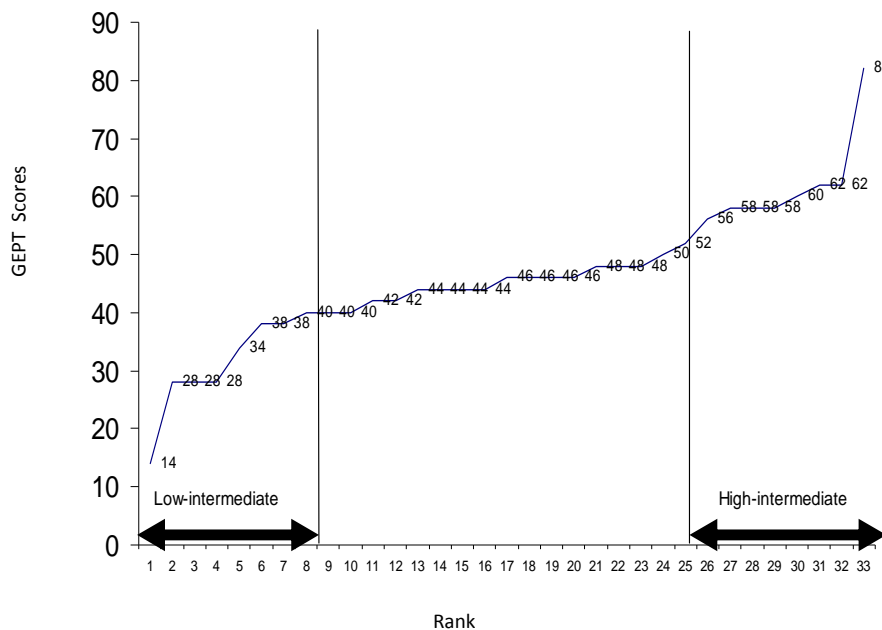
¹¹ Fourteen NES-NNE dyads were same-gendered (female); two dyads were mixed-gendered (NNEs were male and NESs were female).

¹² GEPT; The General English Proficiency Test is a standardized English-proficiency test similar to the TOEFL exam and administered throughout Taiwan. . Examinees can choose the test levels based on their language proficiency. Usually they start from beginner level, proceed to intermediate level, and then move on to advanced level.

¹³ The mini-test set comprises the reading and writing sections of a real test set released by the test center. The test was part of the intermediate-level exam.

Every participant was familiar with email, instant messaging, and general MicroSoft Windows[®] applications. The Taiwanese and American students engaged in online text-based chat around 90 minutes per week to complete their two learning tasks (see Appendix A).

FIGURE 3.1.
Proficiency Test: GEPT Test Results and Two Proficiency Levels.



Materials

According to Long (1991), focus on form embedded in task-based language teaching is empirically and methodologically proven to be one of the most comprehensive instructional methods for helping students overtly notice and correct

their linguistic problems (i.e., “filling the holes”). His claim coincides with Swain’s Output Hypothesis (2000) and noticing as SLA’s prerequisite condition asserted by Schmidt (2001). Chapelle’s seven hypotheses (1998, pp. 23-24) for computer-assisted language learning, which share the principles of SLA suggested by Interactionists, were considered in the design of online learning tasks:

- (1) The linguistic characteristics of target language should be made salient.
- (2) Learners should receive help in comprehending semantic and syntactic aspects of linguistic input.
- (3) Learners should have the opportunities to produce target language output.
- (4) Learners need to notice the errors in their own output.
- (5) Learners need to correct their linguistic output.
- (6) Learners need to engage in target language interaction whose structure can be modified for negotiation of meaning.
- (7) Learners should engage in a second language task designed to maximize opportunities for productive interaction.

In addition, the researcher crafted the tasks by following Bardovi-Harlig’s (1995) suggestion to raise communicative need, which was expected to elicit more interactions between interlocutors and increase the likelihood of learners’ noticing. Also, concept identification is claimed to serve this function by retrieving a wider range of lexical knowledge from learners (Skehan, 1998). Swain (2001) also advocates using socio-cultural factors to foster dialogue between interlocutors. Therefore, culturally-related concept identification is embedded in the two learning tasks used in this study.

Moreover, jigsaw and decision-making task types are claimed to draw more L2 meaning negotiations (subsequent input and output) from interlocutors (Gass, 1997; Pica, 1987; Smith, 2001). The discussion topics of the jigsaw and decision-making tasks were “self-value” and “environmental protection”—prominent yet universal issues that students encounter daily.

Before the cyber connection started, each participant’s short biography and contact information were posted on the project website (see Appendix B). This website was the primary instruction delivery medium for the two learning tasks (see Appendix A). During the first week, the instructor led an in-class orientation for the student during which the participants practiced synchronous text-based chatting with each other.

Treatment Session

Week 1 (Table 3.1) was the orientation phase, during which the students’ familiarity of synchronous CMC agents (AIM, Yahoo Messenger, and MSN Windows Live Messenger) was reinforced. Before the students were assigned randomly to their respective dyads, they were given details about the project website (see Appendix B). Following this orientation, a two-week session was conducted in which participants initiated communication and engaged in an ice-breaking activity with their partners abroad for two weeks. Following that, the first jigsaw task was conducted from week 4 through week 6. The second task—decision-making—started in week 7 and was completed in week 9. During these eight weeks, each dyad engaged in online conversations for approximately 90 minutes per week. The immediate posttest was administrated in week 10 and the delayed posttest in week 14. Participants were not

informed about the posttests beforehand and thus were not able to review the chatscripts prior to the tests.

TABLE 3.1
Timeline and the Stages of the Treatment.

Timeline	Group 1 (8 NES-NNES dyads, lower-intermediate NNES)	Group 2 (8 NES-NNES dyads, upper-intermediate NNES)	Data Collection (16 participants in total)
Week 1	Orientation		LREs in the dyadic correspondence records Results from the two posttests
Week 2-3	Ice-breaking activity		
Week 4-6	Jigsaw task		
Week 7-9	Decision-making task		
Week 10	Immediate posttest		
Week 14	Delayed posttest		

Coding of LREs and Posttests

Each dyad's language-related episodes (LREs) were identified from their eight-week online transcripts¹⁴. LREs are considered a valid measurement to authentically and comprehensively assess students' linguistic knowledge (Swain, 2000, 2001). A total of 512 LREs¹⁵ were coded and categorized into nine characteristics: type, linguistic focus, source, complexity, directness, emphasis, response, uptake, and successful uptake.

After eight weeks of correspondence, two posttests (including immediate and delayed assessments suggested by Long (1991, p. 48) were tailor-made for each Taiwanese learner based on the items each dyad had discussed in LREs. This served as a

¹⁴ The data collection started from the ice-breaking activity in Week 2.

¹⁵ All of the LRE examples provided in the manuscript come from the data collected for the current research. The examples provided reflect the texts used in chat, i.e. no changes have been made. However, the NNES participants' and their counterparts' names have been replaced with pseudonyms.

quantitative index of learners' interlanguage improvement (Loewen, 2005; Shekary & Tahririan, 2006; Swain, 2001). Three types of items were covered: correction, suppliance, and spelling (the same as used by Shekary & Tahririan (2006)).

In the correction test items, which were mostly grammar-related (see LRE 2 for a real example), the NNESs were asked to improve sentences they had incorrectly produced during interactions with their net-partners. A suppliance test was used primarily for the vocabulary-related LREs (LRE 1). These tests required learners to provide a particular definition or meaning for problematic word choice, idioms, or phrases. To test spelling, NNES students were required to differentiate the correct spelling of the words that appeared in LREs. The students' answers to the test items were coded into the three categories: (1) correct (a response matched the targeted item in the tested LRE, e.g., LRE1 and test item 1), (2) partially correct (an acceptable or improved response but was still not the same as the original items discussed in LREs, e.g., LRE2 and test item 2), and (3) incorrect (a response showed that the NNES failed to reproduce the targeted item in LRE, e.g., LRE3 and test item 3).

LRE1 (vocabulary-related item):

Stacy (NES): What time is it there? Is it 11am?

Yvonne (NNES): It's Tue. 12:20am

Stacy: Oh my goodness, our time changed here, because of *daylight savings time*. I am so sorry.

Yvonne: *Oh!really? what's that?*

Stacy: *Here in the United States every fall we put our time back one hour, and in the spring we put our time forward an hour. It is to save electricity and optimize the daylight.*

Yvonne: How many hours are difference between us?

Stacy: Now I think it is 14, maybe?

Yvonne: Oh! I see.

Suppliance test item 1:

What is “*daylight saving time*”?

Correct test response (i.e. the linguistic issue was accurately recalled):

In the United States (or some countries), every fall people put our time back one hour, and in the spring we put our time forward an hour. It is to save electricity and optimize the daylight.

LRE2 (grammar-related item):

Yvonne (NNES): What am I proud of? I think I am proud of *take care* of me by myself.

Stacy (NES): it needs to be *taking*, because of the proposition before the verb.

Yvonne: *Taking care of myself?*

Stacy: Yes!

Correction test item 2:

Please find an error in the following sentence.

Maria is a very good student. She is always serious about *submit* her work in time.

Partially correct answer (i.e. the answer did not reflect the issue discussed in LRE but grammatically and semantically acceptable; the NNES changed the word choice and its form in addition to the preposition *in*):

Maria is a very good student. She is always serious about *finishing* her work *on* time.

LRE3 (grammar-related item):

Yvonne (NNES): Oh~ sorry, *I make a misunderstood!*

Stacy (NES): Oh, it is not a problem, Thanksgiving is coming very soon.

Yvonne: Do you go home for Thanksgiving?

Stacy: Sure, *earlier you should have used "I misunderstood"*.

Correction test item 3:

There is an error in the following sentences. Please correct it.

A: I think *I make a misunderstood*.

B: How is so?

Incorrect test response (i.e. the respondent still could not correct the error discussed in the LRE. The focus is the first utterance, but the NNES changed the second sentence from “*How is so*” to “*Why is so*”):

Why is so?

The first assessment was an immediate test administrated as soon as the treatment concluded in week 10. The delayed assessment was administered three weeks later, in week 14. To avoid item repetition, the immediate test focused on the first half of the data (LREs), and the delayed test covered the second half of the data. A total of

425 LREs were tested (84% of the total LREs produced; the items which NES and NNES failed to figure out a linguistic solution in LREs were withdrawn).

TABLE 3.2
Characteristics of LREs

Characteristics	Definition	Categories
Type	When an LRE is instigated	Reactive: Error correction Preemptive: NNES-initiated query
Linguistic focus	Linguistic target	Grammar Vocabulary Spelling
Source	The reason to instigate an LRE	Code: Inaccurate use of linguistic item with no apparent miscommunication. Message: Problem understanding meaning
Complexity	Length	Simple: Only one response move Complex: More than one response move
Directness	Explicitness of the feedback	Indirect: Implicit (e.g., recast or repetition) Direct: Explicit (e.g., metalingual explanation)
Emphasis	Combination of complexity and directness	Light: Indirect and simple Heavy: Direct, complex, or both.
Response	Type of feedback provided by the NES	Provision: NES gives information about a language form. Elicitation: NES attempts to draw out from NNES a language form or information about a language form.
Uptake	NNES response to feedback	Uptake: NNES produces response. No uptake: NNES does not respond.
Successful uptake	Quality of student response	Successful uptake: NNES incorporates linguistic information into production or show solid evidence of understanding Unsuccessful uptake: NNES does not incorporate linguistic information into production.

Sourced and adapted from Shekary & Tahririan (2006, p. 562).

Table 3.3 shows an example of one LRE and its characteristics in accordance with the coding scheme and the definitions of characteristics of the LREs suggested by Loewen (2005) and Shekary & Tahririan (2006). The LRE in Table 3.3 shows that the word *night store* NNES misused had temporarily caused nonunderstanding by the NES counterpart. When nonunderstandings occurs, an immediate act of meaning negotiation is necessary to help both interlocutors stay on the same page, resolve the confusion together, and resume the main discussion (Gass, 1997). The NES modeled the correct language use *strip bars* and added more information to make herself understood. Therefore, this LRE is *reactive*. Meanwhile, the LRE focused on the word *night store* (*strip bars*) so the linguistic focus is on *vocabulary*. The meaning of the problematic linguistic item impeded communication; the reason for the initiation of this LRE was *meaning* as opposed to code (grammar). More than one response moves were required to resolve the communication breakdown, making it a *complex* LRE. In addition, the NES gave an explicit explanation, which makes it a *direct* feedback to the NNES. Because the NES gave complex and direct explanations, which made the language focus more noticeable to both interlocutors, this LRE showed a *heavy* emphasis on the problem trigger and resolution. The discourse move in this LRE was directly from the NES to the NNES while *providing* the explicit information, without a further attempt to elicit correct word choice from the NNES. Finally, the NNES was receptive of NES' explicit feedback. Not only did she follow with an *uptake*, but the uptake was *successful*—she incorporated NES' input into her new output. Meaning negotiation was accomplished and the task-related discussion between the interlocutors continued.

TABLE 3.3
Example of Coding Scheme

Carrie (NNES): The reason it's he went to <i>night store</i> . There have a lot of sexy girl and drink wine. I don't know how to explain that place. Carrie: Night store sounds a little strange name. Hahaha! Carrie: How about you?? Dennis (NES): <i>We have stores like that. They aren't very good places...we call them "strip bars."</i> Dennis: <i>It's very frowned upon to go there.</i> Carrie: <i>Oh! Strip bars are like dance clubs, right?</i>	Characteristics	Category
	Type	Reactive
	Linguistic focus	Vocabulary
	Source	Meaning
	Complexity	Complex
	Directness	Direct
	Emphasis	Heavy
	Response	Provision
	Uptake	Uptake
	Successful uptake	Successful
The matching suppliance test item: What is a " <u>strip bar/ strip club</u> " ?		

Data Analysis

The frequency counts of LREs and LRE characteristics produced by each dyad and each group were summarized in order to answer the first research question regarding the occurrence of incidental noticing in the CMC setting. After the administration of immediate and delayed posttests, scores were calculated and statistics were produced for each dyad, the higher- and lower-proficiency groups, and the entire sample. This part of statistics helped answer the second research question regarding the subsequent L2 learning from online noticing of learners of different levels. The second stage involved using a chi-square analysis (with the alpha level set at .05) to determine if a significant difference existed between immediate and delayed test performance of lower- and higher-proficiency learners (Ott & Longnecker, 2001).

To address the third question, multi-factorial binary logistic regression analyses were conducted to reveal the best-fitting models to describe the relationship between the dependent variable (correct test responses) and the independent variables (the characteristics of LREs) (see Table 3.4). Logistic regression is used when the dependent variables are binary or dichotomous rather than numerical (continuous). In this case, regression modeling helped determine which characteristics of LRE would best predict test scores. Separate logistic regressions were performed for different proficiency groups (lower- and higher-intermediate) as well as for different test types (correction, suppliance, and spelling) of the posttests, using students' proficiency as a key variable. In stepwise regression, each independent variable is added to the equation one at a time according to the default entry criteria of SPSS 15.0 (from .15 to .20). Each step added the variable that resulted in the highest amount of change to the model. If a variable did not make a significant contribution to the model, it was excluded. An alpha level of .05 was chosen for the purpose of conducting stepwise regression in the present research.

TABLE 3.4
Binary Variables of Logistic Regression

Variable	Value	
	y=0	y=1
Test score	Incorrect	Correct
Type	Reactive	Preemptive
Linguistic focus ^a	—	—
Source	Code	Message
Complexity	Simple	Complex
Directness	Direct	Indirect
Emphasis	Light	Heavy
Response	Provision	Elicitation
Uptake	No uptake	Uptake
Successful uptake	Unsuccessful uptake	Successful uptake
Proficiency level	Lower proficiency group	Higher proficiency group

^a. Not reducible to two variables.

Given that logistic regression allows only binary data ($y=0$, $y=1$), the dependent variable (i.e., the test responses in this study) needed to be dichotomized (incorrect=0, correct=1) (Ott & Longnecker, 2001). Because partially correct responses were considered acceptable and show some degree of learning, they were merged into the category of correct response in order to generate a bigger sample size. Consequently, the assigning of binary values to the independent variables (see Table 3.4) resulted in odds ratios (ORs) and allowed for easier interpretations. The output of a logistic regression analysis was subjected to odds ratios and 95% confidence intervals for each independent variable. Odds ratios generated by such statistical measure indicate the approximate likelihood of the outcome to be among those with $y=1$ than among those with $y=0$ (see Table 3.4). The larger the OR, the better predictor a certain independent variable is (Hosmer & Lemeshow, 2000). For instance, if the independent variable of directness has

an OR of 1.23, this means that for every additional occurrence of direct LRE, other factors being equal, then the likelihood of having a correct answer in posttests are multiplied by 1.23 compared to indirect LRE (i.e., they increase by 123%). But a negative relationship between two variables produces an odds ratio of <1.0 , and the smaller the odds ratio, the stronger the negative relationship.

Reliability of Coding and Testing

The researcher of the present study coded 512 LREs. To estimate the inter-rater reliability of the coding, 50% of the data was coded by both the researcher of the study and the instructor of the Taiwanese participants. The kappa coefficients for LREs coding was $k=.95$.

After coding the LREs, the researchers crafted test items for each NNEs by following the three constructs (correction test type for grammar-related LREs, suppliance test type for vocabulary-related LREs, and spelling test type for spelling-related LREs) suggested by Shekary & Tahririan (2006). Because obtaining the reliability of the individualized testing is impossible in a conventional sense (e.g., testing and retesting for internal consistency), construct validity (suggested by Loewen (2005)) was chosen to ensure the suitability of the test items designed for the present study. In short, the aim was to verify that the test items actually measured a learner's ability to reproduce or recall the linguistic knowledge generated in the LREs.

All of the test items and corresponding LREs were reviewed by the instructor of the Taiwanese participants and her colleague (who is also a language teacher) to ensure that the test items tested the target language issues discussed in LREs. They assessed the

items and categorized them into three categories: appropriate, inappropriate, and uncertain. The agreement between the two raters was 97%. The debatable test items (3%) were excluded from the posttests.

RESULTS AND DISCUSSION

As already noted, most studies on noticing are conducted with either NNES-NNES peer interactions or NES teacher-NNES student interactions in face-to-face settings. NES-NNES peer interactions via CMC, especially NNESs of different proficiency levels, have not been investigated. Because some researchers have reported that NES's participation in a conversation can promote NNES' quality and quantity of language production, especially when lower proficiency level students are involved (Commins, 1996; Williams, 2001), the current study aimed to optimize the effect of noticing by forming NES-NNES peer dyads. By involving NES and taking advantage of CMC's capacities, the researcher expected that there would be few or even no significant differences between the performances of lower- and higher-level NNES learners in this study.

TABLE 3.5
Frequency of LREs Generated by Lower- and Higher-Proficiency Level NNEs

Proficiency Level	Dyads	Number of LREs	Total Number of Words in LREs	Average Number of Words in Each LRE	LREs tested	Percentage of LREs tested
Low	Dyad 1	23	1497	65.09	19	83%
	Dyad 2	20	1100	55.00	19	95%
	Dyad 3	30	1478	49.27	28	92%
	Dyad 4	50	3645	72.90	44	88%
	Dyad 5	29	2208	76.14	22	76%
	Dyad 6	22	1655	75.23	19	86%
	Dyad 7	19	1284	67.58	19	100%
	Dyad 8	70	5636	80.51	46	66%
	Subtotal	263	Average 2313	Average 67.71	216	Average 86%
High	Dyad 9	34	2474	72.76	25	74%
	Dyad 10	29	1620	55.86	28	100%
	Dyad 11	23	871	37.87	21	91%
	Dyad 12	26	1804	69.38	26	100%
	Dyad 13	29	2417	83.34	22	76%
	Dyad 14	38	2621	68.97	34	89%
	Dyad 15	26	1632	62.77	23	88%
	Dyad 16	44	1110	25.23	30	70%
	Subtotal	249	Average 1819	Average 59.52	209	Average 85%
Grand total, mean, and SD	Total	512	33052		425	
	Average	32	2065.75	63.62	26	85.5%
	SD	13.24	1184.26	15.69	8.45	0.11

In order to answer Question 1—Do learners of different language proficiency levels similarly notice the gap in their interlanguage during negotiation of meaning in text-based CMC?—the descriptive statistics in Table 3.5 show that both lower- and higher-level students were able to produce approximately equal amounts of noticing incidents during their online interactions with their NES partners. In order to further

check if there were any significant differences between the two groups, a two-sample one-tailed t-test (with the results in Table 3.5, H_α was that lower group > higher group) was performed on the average utterances generated by the two groups. The p-value of .227 was higher than $\alpha=.05$; hence, there was no significant difference between the two groups. An additional one-tailed t-test (with the test results obtained in Table 3.5, H_α was that lower group > higher group) was performed on the LREs generated by the dyads in two groups. Once again, there was no significant difference between the two groups ($p=.401 > .05$). When dividing the data set in accordance with three linguistic foci of grammar, vocabulary, and spelling, both groups also generated very close numbers of episodes in each category (see Figure 3.2). This is an indication that the combination of CMC context and NES peers may have promoted similar numbers of incidental noticing for L2 learners of different proficiency levels. Moreover, as shown in Figure 3.3, the discrepancy between the frequency counts of LRE characteristics produced by the NNEs in both groups is negligible and therefore will not be discussed in this report. In addition, the similar numbers of LREs between the code-related and message-related episodes (257: 255) indicated that the communicative tasks used in this study successfully promoted incidental noticing of different linguistic issues. The task-based language learning framework has effectively raised learners' consciousness of their linguistic problems, regardless of their proficiency levels.

FIGURE 3.2

The Comparison among the Quantities of Grammar-, Vocabulary-, and Spelling-related LREs Generated by Lower-level NNEs and Higher-level NNEs.

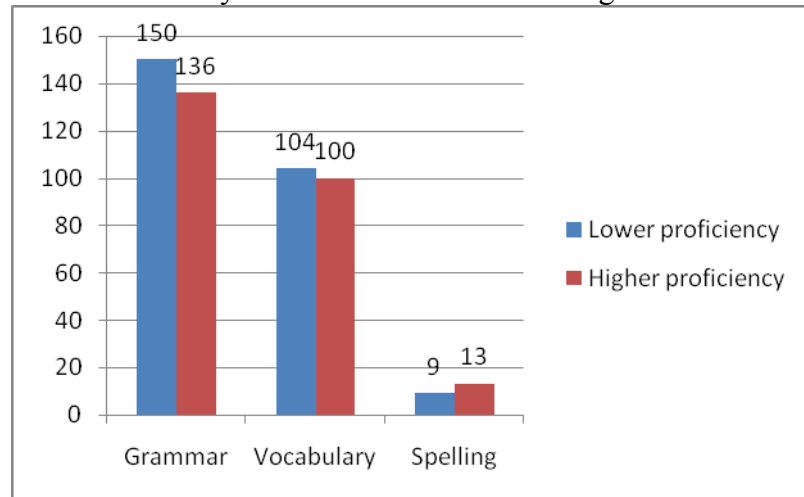
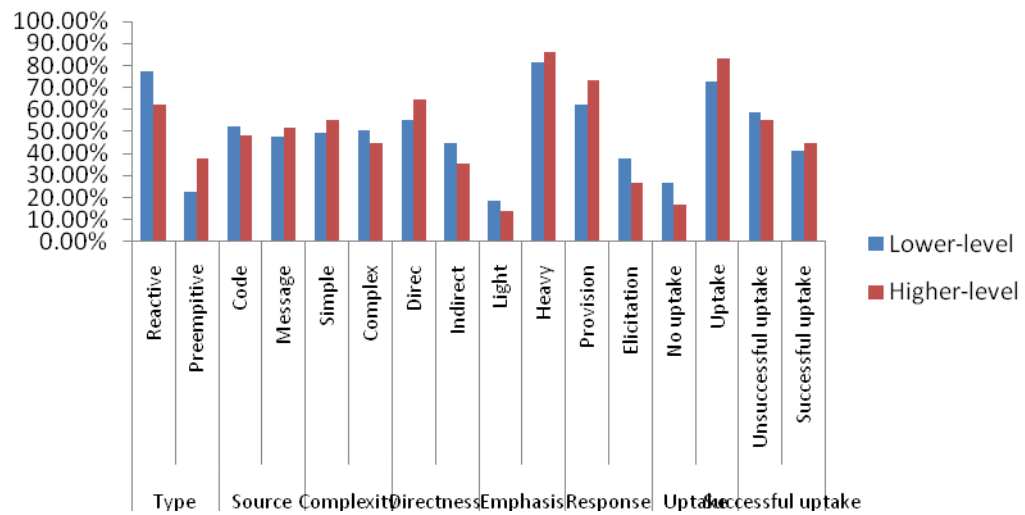


FIGURE 3.3

The Percentages of LRE Characteristics Generated by Lower- and Higher-level Groups

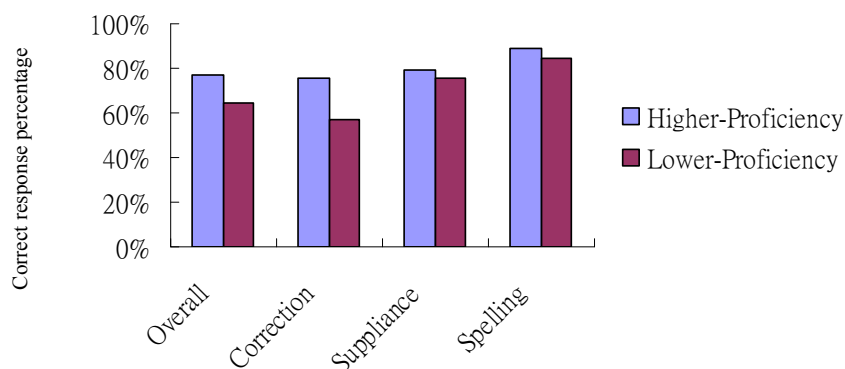


As for the comparison between the two groups (see Figure 3.4), in general, the correct test performance of the lower proficiency group was 64.3%, which was 13.7% lower than that of higher-proficiency students (77%). In correction test type (grammar-related LREs), the lower proficiency level group answered 57.2% of the test items correctly in the posttests while the higher-level group answered 75.8% correctly. In suppliance test types (vocabulary-related LREs), the lower proficiency learners answered 75.3% of the test items where as the higher proficiency learners answered 79% of the test items correctly. Finally, in spelling test type, 88.8% of the responses were correct for the lower proficiency level group and 84.6% for the higher-level group.

TABLE 3.6
Test Results

Test Responses		Immediate		Delayed		Total	
		N	%	N	%	N	%
Low	Correct	60	62.5	79	65.8	139	64.3
	Partially Correct	9	9.3	10	8.3	19	8.8
	Incorrect	27	28.1	31	25.8	58	26.9
	Total		96		120		216
High	Correct	66	78.6	95	76	161	77
	Partially Correct	4	4.8	10	8	14	6.7
	Incorrect	14	16.7	20	16	34	16.3
	Total		84		125		209
Total	Correct	126	70	174	69.3	300	70.6
	Partially Correct	13	7.2	20	8.1	33	7.8
	Incorrect	41	22.7	51	20.8	92	21.6
	Total		180		245		425

FIGURE 3.4
The Comparison between Lower-level NNEs' and Higher-level NNEs' Correct Response Percentages of Correction, Suppliance, and Spelling Test Types.



Three chi-square analyses were used to examine if the differences between the distributions of correct answers produced by two proficiency groups in two posttests (immediate and delayed) were significant. The results showed that there were no significant differences between the posttest results within either group¹⁶ (lower group: $X^2(2, n=216) = .877, p > .05$; higher group: $X^2(2, n=209) = .656, p > .05$). This result indicates that the students of both proficiency levels in this study effectively retained the linguistic items discussed in LREs in both short-term memory and long-term memory. A separate chi-square analysis also showed that there were no significant differences

¹⁶ In order to explore a possible relationship between the two posttest results, the researcher also transformed the categorical data into numerical data by coding (1) correct response as two points, (2) partially correct response as one point, and (3) incorrect response as zero points. After calculating the percentage of each participant's scores (divided by his/her maximum possible scores) in immediate and delayed tests, a paired t-test analysis was conducted. The outcome ($p = .72$ and $.69, p > .05$) showed that there were no significant differences between the results of the two assessments. In other words, the results obtained through t-test analysis and chi-square analysis mutually supported and confirmed the claim of insignificant difference between the results of the two posttests.

among the distributions of correct, partially correct, and incorrect answers in the two posttests between the two proficiency groups: $X^2(2, n=425) = .318, p > .05$. These statistical results indicated that proficiency levels did not affect NNESs' memory retention or decrease of the linguistic knowledge discussed in LREs during the three weeks between the two posttests. The results show that NES' involvement and CMC context facilitated the effect of incidental noticing. Ellis (2001) pinpointed the impact of contextual factors (interlocutors and mediums in this type of study), which could explain the discrepancy between the findings of the current research and other similar studies. Loewen's (2005) study (conducted with NES teacher and NNES students' classroom context) as well as Shekary & Tahririan's (2006) (in an NNES-NNES CMC context) both reported that NNES participants showed obvious memory decrease ranging from 8.3% to 13.6% between the immediate and delayed tests. The NES peers plus text-based CMC in the present study can be used to explain the more accurate recall of linguistic information and better performance of the students on the posttests in this study than that of Loewen (2005) and Shekary & Tahririan (2006). The higher-proficiency group only decreased 1.4% while the lower proficiency level group decreased 0% from immediate to delayed posttests.

The benefits of two-way interactions—both NNES-NNES and NES-NNES—have been acknowledged in the SLA literature under the Interactionist Account. Rulon & McCreary's finding (1986) shows that the same amount of information content was covered by NNESs in their group discussion and by the class that was led by the teacher. The amount of negotiation between NNESs was not higher than that between NES

teacher and NNEs as hypothesized; the researchers suspected the reason to be students' proficiency levels. Students of higher proficiency tended to ignore the intelligible speech made by the peers of lower proficiency (i.e., the triggers of meaning negotiation were overlooked) in the face-to-face context. In other words, noticing was not always present between NNEs-NNEs oral interactions in this case. However, in Kern's (1995) comparative study between CMC and face-to-face contexts, CMC was proven to facilitate meaning negotiation between NNEs, and the language output in CMC context significantly outnumbered that in face-to-face setting. CMC's friendly environment encouraged those who might otherwise be reluctant to participate in oral discussions to be more active in computer-mediated discussions. Nonetheless, Kern also pointed out that "grammatical accuracy suffers [when chatting casually via CMC], and consequently learners read 'defective' language [produced by NNEs peers]" (p.470). These studies not only presented the benefits L2 learners can gain from NNEs-NNEs interaction, but also its limitations. The limitations might be the reasons that some other researchers chose to compose NES-NNEs dyads in their studies.

Common findings in the pertaining literature in CMC and face-to-face contexts (Kung, 2002; Long, 1983b; Porter, 1983; Schwienhorst, 2004; Williams, 2001) show that NES counterparts are more capable of giving immediate feedback (negative evidence or error correction) to offer comprehensible input (foreigner talk discourse), present ideal language models, reveal the gap between the NNEs and NES language productions (resulting in more native-like interlanguage), have better control of the conversation flow, and apply more communication strategies to repair communication

breakdowns. Even though literature also supports NNEs-NNEs interactions and presents the possible interlanguage improvement without NNEs' involvement (Porter 1983, Smith, 2003b, 2004), it is still undeniable that NNEs are more likely to have the mastery knowledge and ability to explain their first language in details (e.g., the nuance of synonym, idiomatic expressions, or grammatical exceptions). Along the same line, the NNEs in the present study facilitated and reinforced apperception (i.e., noticing), comprehension, intake, and integration and thus had a significant impact on NNEs' learning and memory. Consequently, the dual-stimulus of NNE peers and dyadic CMC facilitated the better performance of the learners in this study compared to other similar studies.

To address Question 3—What characteristics of incidental noticing, if any, best predict interlanguage development of learners at different proficiency levels during text-based CMC?—the whole dataset was first divided by the two proficiency levels, and two separate logistic regressions were performed on the two subsets. As shown in Table 3.7, successful uptake entered both models as a strong predictor for both groups of learners (OR=2.779 for lower proficiency level group and OR=3.232 for higher-level group). This outcome corresponded to Loewen's (2005) and Shekary & Tahririan's (2006) and endorsed the importance of the quality of uptake as opposed to the mere presence of it. Shekary & Tahririan (2006) emphasized the important of NNEs' successful uptake in SLA through natural conversations:

It is the correct production of linguistic information during LREs that helps learners produce the same correct information in the test item.

Negotiating about language is not enough. . . . If they negotiate and consciously reflect on linguistic items, and conclude the LRE with a correct solution, they are more likely to remember the linguistic forms later (in the posttests) than if they just negotiate the language (p. 570).

TABLE 3.7
Logistic Regression Results of Uncategorized Test Items Divided by Proficiency Levels
(Lower-Proficiency vs. Higher-Proficiency)

	Predictors	95% Confidence Intervals		OR	p-value
		Lower	Upper		
Lower-proficiency	Directness	.170	.705	.347 (2.882)*	.003
	Successful uptake	1.274	6.061	2.779	.010
Higher-proficiency	Successful uptake	1.508	6.928	3.232	.003

Note: Predictors with ORs of less than 1 were also reported in their reciprocal values (when $y=0$), marked with asterisks. $\alpha=.05$ was chosen to be the cut-off point to exclude the less significant predictors.

However, directness only entered lower-proficiency NNEs' model with a high OR of 2.882, which means that more explicit feedback was more effective in promoting noticing and subsequent language for less proficient learners than implicit feedback (recast or repetition). This finding corresponded to Ellis et al. (2006) and Gass (1997), who asserted the advantage of explicit feedback over implicit feedback from the interlocutors (NES teachers or peers) during communicative tasks. When NESs attempt to elicit more information (improved output) from NNEs, NNEs are pushed [through noticing] to transform their declarative knowledge into procedural rules while contemplating a linguistic problem and possibly a solution (Schmidt, 1990). Porter

(1983) conducted an empirical study on 12 NNEs (two levels of proficiency: intermediate, advanced) and six NESs of Spanish. She concluded that less-proficient learners demonstrated greater need for conversation repair tactics from NESs than advanced learners. Meanwhile, higher-proficiency learners did not appear to be affected by the type of feedback NES peers provided in LREs. This echoes Williams' (2001) findings that more-proficient learners were more ready for and more receptive of various linguistic feedbacks from either NES teacher or NNEs peers during LREs, compared to less-proficient classmates.

Knowing that proficiency levels could qualify different LRE characteristics as strong predictors in logistic regression analyses, the researcher included the learner's proficiency level as a new independent variable—in addition to the LRE characteristics—and recombined the subsets of data for a bigger sample size (425 LREs) to precede the second part of the analysis. The purpose is to examine the impact of NNEs' proficiency level on incidental noticing. To be more specific, the researcher intended to fully explore whether NNEs' proficiency level was a powerful predictor of their successful LRE-related memory recall in the two posttests. Three more logistic analyses were conducted in accordance with test types: overall (uncategorized data), correction, and suppliance. However, the sample size of spelling-related LREs was too small ($n=22$), and thus no claim can be made.

TABLE 3.8
Logistic Regression Results (with Proficiency Level as an Additional Variable)

Test item type	Predictor variables	95% Confidence Intervals		OR	p-value
		Lower	Upper		
Uncategorized	Directness	.315	.800	.502 (1.992)*	.004
	Response	1.142	3.213	1.915	.014
	Successful uptake	1.578	4.602	2.695	.000
	Proficiency	1.120	2.744	1.753	.014
Correction	Directness	.289	.988	.534 (1.873)*	.046
	Response	1.078	4.099	2.102	.029
	Successful uptake	1.048	4.300	2.123	.037
	Proficiency	1.311	3.967	2.281	.003
Suppliance	Source	1.366	32.963	6.711	.019
	Directness	.061	.665	.202 (4.950)*	.009
	Successful uptake	1.883	11.869	4.728	.001
Spelling	--	--	--	--	--

Note: Predictors with ORs less than 1 were also reported in their reciprocal values (when $y=0$), marked with asterisks. $\alpha=.05$ was chosen to be the cut-off point to exclude the less significant predictors.

In the three regression analyses, successful uptake entered all three models as a prominent predictor (see Table 3.8), similar to the results obtained in the first part of the logistic regression analyses as shown in Table 3.7. In the first logistic regression of all test responses (i.e. before categorizing the samples into three different test item types), successful uptake was the most powerful predictor with the highest OR of 2.695. Moreover, three other significant predictors also entered the model: directness, response, and proficiency level. This outcome indicated that direct (explicit) feedback (OR=1.992) and NES' attempt to elicit responses from NNEs (OR=1.915) also positively affected NNEs' correct response performance in the posttests. Several empirical studies found NES' competency in using communication strategies (e.g., clarification or elicitation)

quite critical when interacting with NNEs (Long, 1981, 1983b; Pica & Doughty, 1985). The idea is to promote meaning negotiation and “pushed output” (Swain, 2000, p.99) from NNEs by activating their existing knowledge and generating new output. Eventually, NNEs’ interlanguage quality improves.

Furthermore, as shown in Table 3.8, a learner’s proficiency level had an OR of 1.753 in the model. In other words, when other variables are held equal, the likelihood of correctly recalling the LRE-related linguistic information are almost 1.753 times higher for more-proficient learners than for less-proficient ones. This result shows that NNEs’ proficiency was an influential factor on learners’ performance on the posttests. Williams’ (1999; 2001) studies in a conventional classroom setting also reported that higher-proficiency level learners performed better in the posttests and that they were equally receptive to the feedback from both their NES teacher and NNEs peers in LREs. On the other hand, low-proficiency learners responded better to their NES teacher compared to their NNEs peers.

Our results show that the frequency of learner-generated LREs, the posttest performance, and a learner’s proficiency were positively correlated. However, there is a clear contextual difference between Williams’ study and this study. First, the lower proficiency level NNEs in the present study were able to generate approximately the same number of LREs as the higher-level ones. The reason could be that the present study had a smaller difference between the two levels of language proficiency (lower-intermediate and higher-intermediate) than Williams’ (2001) which included four levels of NNEs. Second, even though the higher-proficiency group in this study had more

correct answers in the posttests (by 12%) than the lower-proficiency group (see Table 3.6 and Figure 3.4), there were no significant differences between short- and long-term memory retention between the two groups. In fact, the lower-proficiency NNEs' group did not show a decrease of memory retention between immediate and delayed tests while the higher proficiency learners showed a 3% decrease. One possible explanation for this could be that each NNEs participant was assigned an NES peer to interact with weekly to provide personalized instruction. Schinke-Llano (1986) emphasized the particular type of correction feedback needed by lower-proficiency learners in her research; the less-proficient students in the classroom responded better when immediate, explicit corrections were given. Along the same line, the NNEs in the current study obtained direct and explicit feedback from their NS peer (taking the role of tutor) who facilitated NNEs' knowledge integration through incidental noticing and eventually improved L2 output (Ellis, 1997). Gass (1997, p. 115) also claimed that "when the indicator (feedback) is explicit and direct, there is a greater likelihood that change will result." Similarly, the results of this study show that explicit feedback and response were significant predictors of learners' performance on posttests. Moreover, the textual presentation/display of the interactions via CMC allowed NNEs more time to analyze and to internalize the knowledge provided by NESs (M. S. Smith, 1993, p. 170). Under this dual influence, the difference in performance between less- and more-proficient NNEs' was reduced in the current research.

TABLE 3.9
Results of the Logistic Regression of Correction Test Item Type

Test Item Type	Predictor	95% Confidence Intervals		OR	p-value
		Lower	Upper		
Correction	Directness	.289	.988	.534 (1.873)*	.046
	Response	1.078	4.099	2.102	.029
	Successful uptake	1.048	4.300	2.123	.037
	Proficiency	1.311	3.967	2.281	.003

Two additional logistic regressions were conducted to further explore what the effect of NNES' proficiency was in correction and suppliance test items. In the regression analysis on the correction item type (grammar-related items) (Table 3.9), successful uptake entered the model with the second-highest OR of 2.123. However, proficiency level served as the strongest predictor (OR=2.281) in this analysis. NNESs of higher proficiency answered 75.8% of the items correctly in the posttests, while the lower proficiency group answered 57.2% of the items correctly. The impact of noticing on grammar-related performance was not similar for the two proficiency groups with higher proficiency learners outperforming lower proficiency ones. Our findings support the claim that learners' skill and ability level can determine how ready they are to notice new forms during interactions (Bardovi-Harlig, 1995; Schmidt, 2001). This test item type appeared to be more challenging to lower-proficiency NNESs. In Williams' (2001) study, learners with higher proficiency also outperformed those with lower proficiency in grammatical test items. The reason could be that the lower proficiency students' existing knowledge was not enough to support the grammatical input from their NES counterparts. In other words, the new and old knowledge comparison and integration

during their cognitive process was neither successful nor complete (Ellis, 1997). Moreover, the complex grammatical explanations from the NESs were in L2 (the target language) as opposed to their native language (Benjamin, 2001; Feuillard, 1997; Weatherford, 1997). The two-folded challenge might explain why proficiency level was such a powerful predictor in this test item type.

TABLE 3.10
Results of the Logistic Regression of Suppliance Test Item Type

Test item type	Predictor	95% Confidence Intervals		OR	p-value
		Lower	Upper		
Suppliance	Source	1.366	32.963	6.711	.019
	Directness	.061	.665	.202	.009
	Successful uptake	1.883	11.869	(4.950)* 4.728	.001

Nevertheless, proficiency level was not as influential in the regression analysis of suppliance test items (Table 3.10) and did not enter the model as a powerful predictor. Higher-proficiency learners answered 79% of the test items correctly, while the lower proficiency level learners answered 75.3% of the suppliance test items correctly. The difference was not substantially significant, and NNEs in both groups were receptive to NESs' message-related input through meaning negotiation in the CMC context. The focus in suppliance test items was on vocabulary, and this could explain why source (i.e., message-related LREs) entered the regression models for the first time.

The results of logistic regression analyses support that task-based language learning (TBLL)—focusing on both meaning and form—makes vocabulary less

challenging to learners when new lexical items are used in a meaningful context. It reflects the pivotal idea of communicative language teaching/learning. The finding also echoed Tekmen's (2006) empirical study of incidental noticing of vocabulary learning. Her results revealed that only a small difference (6%) between the posttest results of intermediate and upper-intermediate levels of NNEs in her study. However, she did find significant differences between advanced level and intermediate level as well as upper-intermediate level of learners. Her explanation was that "there is a threshold level of vocabulary below which a learner cannot read well enough to learn new vocabulary through reading [without explicit instruction]" (p.235). Her argument underscored the importance of direct feedback offered in language classrooms, which can also justify the findings in the present study.

CONCLUSION AND IMPLICATIONS

Proficiency level has seldom been researched as a major variable in the literature regarding incidental noticing. The current study aimed to explore the possible effect this variable created in a text-based CMC setting. The researcher included NESs and CMC in this task-based language learning with the goal of optimizing the effect of noticing in the CMC context. The results show that learners of both proficiency levels were able to generate approximately equal amounts (rates) of LREs and utterances, which indicates that proficiency level did not impede learners' ability to notice their own linguistic gaps in interlanguage during CMC. Nevertheless, statistical results show a difference of performance between the two groups of learners. Learners of higher proficiency

outperformed the learners in the lower proficiency level group, especially on grammar-related test items (i.e., correction) in posttests. As for memory retention in the immediate and delayed tests, lower proficiency level learners did not show any decrease while higher-level learners' performance only decreased by 2.6% during the three-week period between the two posttests. This decrease appeared to be less than the findings in other similar studies (Loewen, 2005; Shekary & Tahrarian, 2006). NNEs of higher and lower proficiency levels had similarly benefited from the textual display of natural interactions with their NES peers during task-based CMC. The high amount of learner-generated LREs and the correct test responses have shown that the double stimuli of NES and CMC serve to raise linguistic awareness and subsequent L2 learning of NNEs of both proficiency levels.

The logistic regression analyses also suggested that successful uptake was a significant predictor of subsequent L2 learning of the NNEs in both groups, which is consistent with existing face-to-face and CMC research of incidental noticing. Lower proficiency level NNEs were able to generate 41.4% successful uptake in 263 LREs, while higher-level NNEs had 44.6% out of 249 episodes (Figure 3.3). The ratios were very close, which indicates that lower proficiency students were able to generate as much successful uptake as their higher proficiency peers. Meanwhile, the LRE characteristic of directness (explicit feedback) was particularly significant to learners at the lower proficiency level. It helped them recall the linguistic knowledge discussed in LREs and generate correct test responses in posttests. The direct (explicit) corrective feedback from NESs evidently facilitated learners' subsequent L2 learning. However,

lower-proficiency NNEs received only 55.1% direct feedback during the treatment, which was only 10% more than indirect feedback (44.5%) (Figure 3.3). This situation reflects Loewen's (2002) assertion that more direct feedback should be made highly available to this type of learners in order to increase the effect of incidental noticing in both CMC and face-to-face settings.

Proficiency level particularly influenced a learner's performance on grammar-related LREs (tested with correction test item type). Weatherford (1997) explained that NNEs of lower proficiency tend to struggle when offered grammatical explanations in L2, and therefore explicit feedback can make input more salient to lower proficiency level learners. To make input more comprehensible, this type of feedback is critical. In fact, the higher-proficiency learners in the current study received 64% direct feedback (i.e., almost 10% more than what lower proficiency level classmates were provided) and only 35% indirect feedback, which might be a reason why they had better performance in posttests than lower-proficiency learners, especially on grammar-related test items. It is interesting to note that higher proficiency learners received more direct feedback than lower proficiency students when interacting with NES peers.

Additionally, the results also show that proficiency level was not a critical factor in meaning-related test items (i.e., suppliance test item type); students of both proficiency levels were equally receptive of lexical and semantic feedback from their NES counterparts. CMC's pedagogical capacities allowed learners to visually analyze and internalize the input and carefully craft the output. Despite the small sample size and the short duration of the present research, the findings suggest that explicit feedback and

elicitation techniques tend to promote learners' linguistic awareness and subsequent L2 learning through noticing in online context. Finally, although NNES-NNES and NES-NNES interactions can both benefit L2 learning, NES' involvement remains a performance booster in collaborative communicative tasks. This involvement provided the NNES peers "rich instruction" through the provision of detailed explanations for words (Tekmen, 2006, p. 222), so that keywords would not impede communication. Tekman also argued that "explicit rich instruction can serve to bridge the gap between learners' current proficiency level and the level demanded by the input . . . and hence speed up the language learning process" (p. 222). Future researchers and classroom practitioners are encouraged to consider the possible pedagogical effects when offering different types of feedback for different aspects of linguistic knowledge input to the L2 learners of different proficiency levels in both classroom and CMC settings.

It is suggested that future researchers include learners of wider range of language proficiency. The learners included in the study were all from the same class; hence there was not a significant discrepancy between the two groups of learners in terms of language proficiency. This could be the reason why the posttest results were very close between the two groups of learners. Future studies are recommended to either increase the discrepancy between the levels or include more proficiency levels for the purpose of comparison.

Moreover, the online collaboration in this research was not conducted in a fully controlled classroom setting due to the 14-hour time difference between NESs and NNESs. Each dyad engaged in CMC after class, chose their own chat agents with their

partners, and autonomously followed the instructions of a 90-minute session per week. Since this study included only 16 participants and thus produced a small sample size of LREs, a more controlled experimental setting could increase the quality and the quantity of data collection. For instance, some Taiwanese students complained about technology-related failures (such as bad Internet connection or computer breakdowns) during the online chats, which had caused the loss of chat records stored in message archives. In addition, some dyads did not build a strong sense of partnership and hence engaged in shorter online conversations. On the other hand, some developed friendship and interacted voluntarily with each other more than once a week, even though they were instructed to perform a 90-minute session each week. All of these issues could have been prevented if the NES-NNES online interactions occurred in a more controlled setting.

CHAPTER IV

CONCLUSION

SUMMARY

The purpose of this dissertation was to explore the pedagogical effect of incidental noticing in a text-based CMC environment and the impact of the learner's proficiency level. Sixteen NNEs participants from a four-year college in Taiwan collaborated with 16 NES peers in Texas, U.S. via chat agents in order to complete two communicative learning tasks over a two-month period of time. An immediate and a delayed posttest were customized for each NNEs in order to assess his/her L2 learning outcomes. In addition, LRE's characteristics were expected to serve as powerful predictors of learners' performance in their posttests. In order to unveil the possible impact of the learners' language proficiency level and its effect on noticing in a CMC context, the NNEs were tested and divided into low- and high- intermediate language proficiency levels. The findings revealed how CMC context and NES-NNEs peer interactions benefit learner's noticing and affect the L2 learning of NNEs of different levels of language proficiency.

The L2 learners in this dissertation research were not only able to notice their gaps in interlanguage, but they also showed subsequent language learning in the aspects of grammar, vocabulary, and spelling. Task-based language learning framework effectively raised learner's multi-dimensional linguistic awareness while they processed input, which lends support to Schmidt's (2001) claim on the impact of noticing. NNEs' posttest performance showed that incidental noticing facilitated learner's linguistic

knowledge intake and memory retention (both short- and long-term). Text-based CMC created a visual and collaborative context which allowed NES peers to offer NNEs of different levels personalized feedback, through which learners in the present study outperformed those in other similar research conducted in either face-to-face contexts or with NNEs-NNEs dyadic interactions (Loewen, 2005; Shekary & Tahririan's,(2006)).

Nevertheless, statistical results show a difference in performance between the two groups of learners. Learners of higher proficiency outperformed the learners in the lower proficiency level group, especially on grammar-related test items (i.e., correction) in posttests. The decrease [from the immediate to delayed posttest] appeared to be less than the findings in other similar studies (Loewen, 2005; Shekary & Tahrarian, 2006). NNEs of higher and lower proficiency had similarly benefited from the textual display of natural interactions with their NES peers during task-based CMC.

Among LRE's characteristics, successful uptake, as a powerful predictor, constantly entered all the models generated by logistic regression analyses, which underpinned the importance of quality uptake during the two-way communication for L2 learning. This outcome corresponded to the findings of pertinent literature. In addition, directness (explicit feedback) and response (elicitation) also appeared in regression models of the two subsets of LRE data (correction and suppliance test item types), which indicated the particular type of feedback needed by learners, especially by the lower-proficiency level NNEs. Explicit feedback (i.e. "rich instruction") would make input more salient (Tekmen, 2006), with which learners would be more likely to recall LRE-related linguistic items. Meanwhile, NES peers applied elicitation technique to redirect

learner's attention to the problematic utterances and initiated meaning negotiation. Simultaneously, learners were presented with opportunities to internalize, analyze the input (feedback) and craft their output; hence L2 learning occurred.

PEDAGOGICAL IMPLICATIONS

The pedagogical implications from the findings are:

1. Teachers should make language input more salient in order to facilitate the occurrence of noticing effect when students engage in task-based CMC.
2. Teachers should include as much peer negotiation as possible in CMC settings, so that learners can re-examine their interlanguage—with the visual display of chats on the monitor—in the collaborative dialogues for problem solving.
3. When teaching multi-level classes, learners' proficiency level should be taken into consideration. Teachers should choose the type of error correction and feedback consciously, as opposed to doing it out of preference or convenience. Explicit feedback and elicitation technique should be made available as much as possible in both CMC as well as classroom settings.
4. Teachers should always give students enough time to generate successful uptake as opposed to rush them through a topic under the time constraints.
5. Even in face-to-face L2 classroom settings, teachers can still incorporate this type of task-based CMC as a warm-up activity before learners engage in topic discussions in person.

LIMITATIONS AND FUTURE RESEARCH

All the NNES participants were from the same class for practical reasons and therefore the range of language proficiency among participants was limited. However, one of the major foci of the dissertation was to examine the possible impact of NNES' proficiency level on noticing. Since all the NNEs came from the same class with similar background, consequently the discrepancy between the two levels was limited. Future studies are recommended to cover a broader range of language proficiency levels and re-examine the effect of this important factor.

Moreover, the online collaboration in this research was not conducted in a fully controlled classroom setting, due to the 14-hour time difference between NESs and NNEs. Each dyad engaged in CMC outside of class (in their personal time), chose their own chat agents with their partners, and autonomously followed the instructions of a 90-minute session per week. Since this study included only 16 participants and thus produced a small sample size of LREs, a more controlled experimental setting could increase the quality and the quantity of data collection. For instance, some Taiwanese students complained about technology-related failures (such as bad Internet connection or computer breakdowns) during the online chats, which had caused the loss of chat records stored in message archives. In addition, some dyads did not build a strong sense of partnership and engaged in shorter online conversations. On the other hand, some developed friendship and interacted voluntarily with each other more than once a week, even though they were instructed to perform a 90-minute session each week. All of these

issues could have been prevented if the NES-NNES online interactions occurred in a more controlled setting.

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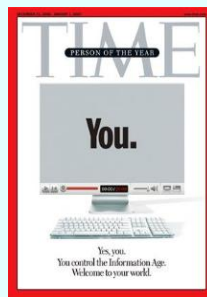
APPENDIX A

TASK 1 AND TASK 2

Learning Task 1: Jigsaw

Discussion topic: Self-Value

In this task, we'll learn about self-value in different cultures. This first picture is the cover of the Time Magazine. As you can see, YOU were chosen to be THE MOST IMPORTANT PERSON OF YEAR 2006 on TIME Magazine cover. Wow, do you think you deserve this title? Obviously, you are not as famous as Oprah or Bill Gates, but why do you think Time Magazine editors would make the decision like that?



Step 1. Take a look at these pictures here. What are these pictures telling you? You've seen some of them before. Pick the ones that you recognize and explain them to your partner.

For Taiwanese partner



For American partner:



Step 2: Answer the following questions and exchange the answers with your partner.

Question 1: Am I an important person to the world? Why or why not?

Question 2: What is it about me that I am proud of?

Step 3: After reading your keypal's answers, try to respond to the following questions in your next message to him/her:

Part 1: Which part of his/her answer confuses you and needs further explanations?

Part 2: Which part of his/her answer that you find particularly interesting, and why?

Step 4: By now you should see the differences between you and your partner. Well, let's pause and think for a second. Carefully consider all these questions and reply to your partner:

Question 1: Is there such a big difference between the answers from you two?

Question 2: Is the difference caused by cultural differences, or something else?

Step 5: The Taiwanese keypal will draft a 150-200 word summary based on the key points of the discussions and submit it to your instructor.

Rationale for the task design:

Jigsaw task type: A jigsaw is a “compound task”—the first half is information gap task, and the second half is an opinion exchange task, or vice versa (Ellis, 2003, p. 86). As Pica et al (1993, p. 20) noted, “interlocutors hold portions of a totality of information which must be exchanged and manipulated later to complete the task.”

The adopted TBLL framework is based on Willis (1996). This task starts with a discussion on several distinct pictures representing some important socio-cultural issues in Chinese/ Taiwanese history as well as western/American culture. The concept-identifying topic theoretically draws more dyadic discussion (Chen, 1990). Even though both sides of a dyad are able to access all the pictures on the project website, the Chinese characters will not be comprehended by American students unless the words are translated and the meanings are explained. For the pictures of American culture, they are chosen for their representation of American women's progression which also requires explicit explanations from the American counterparts. In step 1 (a pre-task phase), the participants will exchange the aforementioned cultural knowledge (information exchange) and expose themselves to some topic-related lexical items necessary for the later discussion. From step 2-5, the dyads will use their understanding of each other's culture and complete the discussion together. At step 5, a task product will be submitted as a wrap-up.

Learning Task 2: Decision-making

Discussion topic: Save the World

From our discussions in the last task, you know how important you are and how you can

affect the people around you. But now, there is some bigger crisis in our life that is developing silently everyday! Cold facts: why do you think you'd need to turn on the heater in April in Texas? Why would it snow in Dallas in March? Why the summer in Taiwan is getting hotter and hotter each year and more and more mosquitoes are bugging everyone? What happened when the abnormal weather and the related disasters are occurring here and there in the different regions of the world all the time? Something is not right! What is the problem? In task 2, you will find out the possible cause of the crisis and make a critical decision.

Step 1: Reality check

By now you might have figured this out with your partner; it is all about GLOBAL WARMING.

In this task, you and your partner will do a reality check on how bad natural environment has become around us. Then you will make a decision on what you would like to do for you, yourself, your community, your people, the earth, and most importantly your future children. Look at what has happened to U.S. and Taiwan!



Flooding and drought in the summers of Taiwan.



**Hurricane Katrina
&
drought in Matthiessen State Park (IL)**

Step 2. [Watch a web-video from abc News and find out how bad things are right now and in few years.](#)

Step 3: Make a commitment and put it into action.

Take a look at some solutions offered on the [web](http://www.liveearth.org/crisis_solutions.php)
http://www.liveearth.org/crisis_solutions.php

Make a decision together with your partner by choosing 3 things that both of you are willing to do as your commitment. From the 5 dimensions listed on the webpage: at home, shopping, on the job, transportation, and community. Commit 3 changes you both agree to make together for at least 3 days. During this task, you two will share how and why you two should or shouldn't make this commitment and stick to it.

Step 4: Final Product

In a 150~200 word action report, Taiwanese partners will

- 1) List the 3 changes as your 1-week commitment to save the Earth.
- 2) Describe your experiences of putting these things into actions in the past week.
- 3) Submit your task product to your instructor.

Rationale for the task design:

Decision-making task type: A decision-making task requires dyadic consensus. But unlike a jigsaw, there can be more than one outcome. Both interlocutors obtain shared access to information; a two-way exchange and subsequent interaction are expected but not necessary (Pica et al., 1993, p. 22).

The task design still follows Willis' (1996) framework. As the previous task, the concept-identifying topic is prone to elicit more dyadic discussion (Chen, 1990). Several pictures of the national disasters serve as visual triggers for students to share their personal experiences with each other. This is also the pre-task phase which will elicit some topic-related lexical items for later discussion. A video-clip can be challenging for the NNSs which will draw more lexical knowledge and meaning negotiation between two partners. Most importantly, the discussion topic is currently advocated by most countries (especially the Taiwanese and the U.S. governments), which will build a common ground (intersubjectivity) for both sides of the dyads. The process and the information in the task instruction intend to enhance what the students have been exposed to in their daily life and put the words into action, which increase the task practicability and authenticity.

APPENDIX B

PROJECT WEBSITE



VITA

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